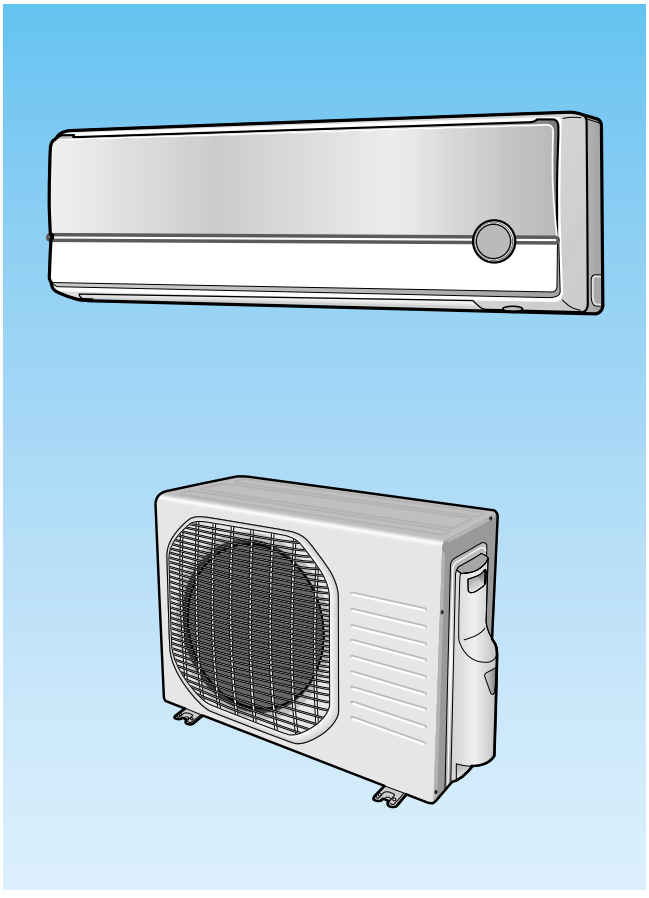
SAMSUNG

ROOM AIR CONDITIONER

INDOOR UNIT	OUTDOOR UNIT
SH09BPH	SH09BPHX
SH12BPH	SH12BPHX

SERVICE Manual

AIR CONDITIONER



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1. Product Specifications

1-1 Table

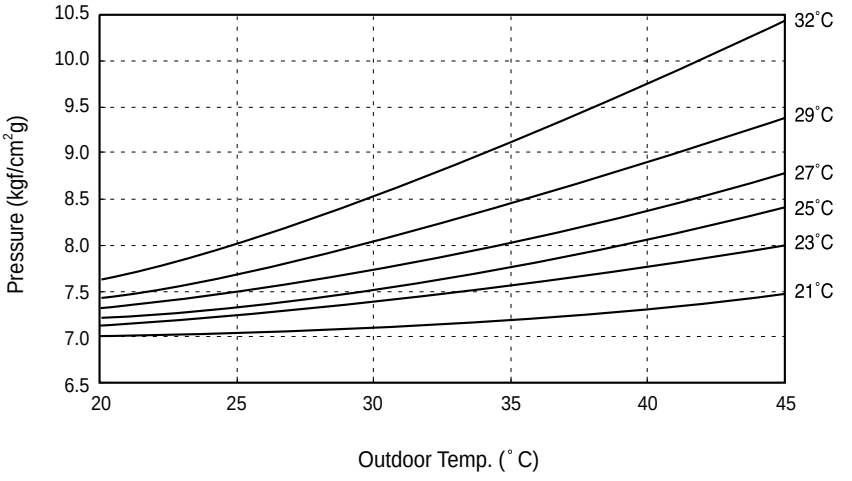
Item			Model	SH09BPH SH09BPHX	SH12BPH SH12BPHX
Power Source			ø-V-Hz	1-220/240-50	1-220/240-50
Perfor-mance	Cooling	Capacity	W	2,800(1,500~3,400)	3,500(1,500~4,000)
			BTU/h	9,500(5,100~11,600)	11,900(5,100~13,600)
		Energy Efficiency Ratio	BTU/wh	11.8(10.0~13.8)	10.9(10.2~13.8)
		Air Flow	m^3/min	5.5	6.5
		Moisture Removal	ℓ/h	1.5	1.6
		Noise Level Indoor	dBA	34	39
		Outdoor		53	53
	Heating	Capacity	W	3,200(1,500~4,500)	4,000(1,500~5,000)
			BTU/h	10,900(5,100~15,300)	13,600(5,100~17,000)
		Energy Efficiency Ratio	BTU/wh	13.6(10.2~14.6)	11.6(10.0~14.6)
		Air Flow	m^3/min	7.5	8.3
		Noise Level Indoor	dBA	39	42
		Outdoor		53	53
Electrical Rating	Available Voltage Range		V	187~264	187~264
	Cooling	Running Amperes	A	3.6(2.0~4.9)	4.8(2.0~5.9)
		Power Input	W	800(370~1,150)	1,090(370~1,330)
		Power Factor	%	96.6(84.5~97.6)	98.0(82.3~98.7)
	Heating	Running Amperes	A	4.0(1.8~6.5)	5.5(1.8~7.2)
		Power Input	W	880(350~1,500)	1,170(350~1,700)
		Power Factor	%	95.6(81.8~98.6)	97.8(81.8~98.4)
	Starting Current		A	10↓	10↓
	Fuse Capacity		A x V	3.15 x 250 / 20 x 250	3.15 x 250 / 20 x 250
	Power Cord		A x V	15 x 250	15 x 250
	Cable-Connector		mm^3 x G	1.5 x 4	1.5 x 4
Com-pressor	Type		-	Single Rotary	Single Rotary
	Model Name		-	G4C090LU1ER	G4C090LU1ER
	Safety Devices		-	204CT	204CT
Fan Motor	Indoor	Model Name	-	YDK-204F8C-1	YDK-204F8C-1
		Running Capacitor	µF x VAC	1.2µF / 450V	1.2µF / 450V
	Outdoor	Model Name	-	AMASS-020WTVB	SIC-52FV-D828-1
		Running Capacitor	µF x VAC	1.7µF / 450V	-
Refrigerant Tube		EEV		UKV-18D11	UKV-18D11
Refrigerant to Charge (R410A)			g	1000	1000
Dimension		Indoor unit : W x H x D	mm	890 x 285 x 180	890 x 285 x 180
		Outdoor unit : W x H x D	mm	720 x 548 x 265	720 x 548 x 265
Weigth		Indoor unit	kg	9	9
		Outdoor unit	kg	33.8	33.8

Remark : Text condition

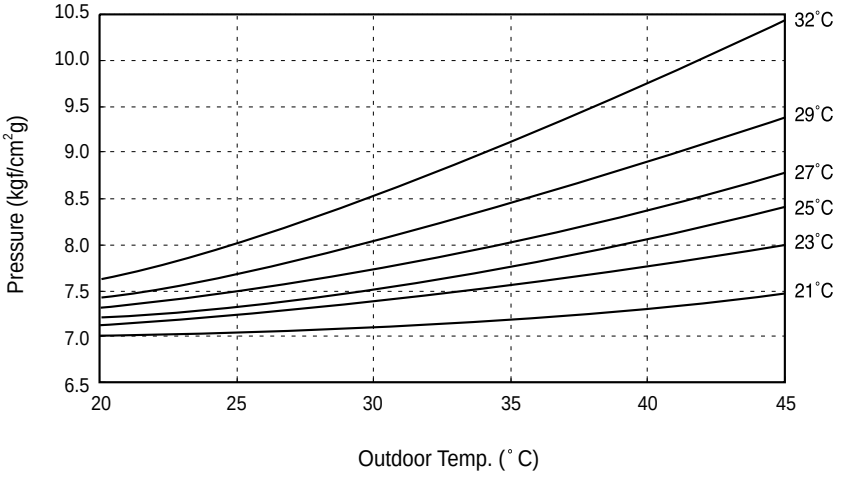
	Indoor room	Outdoor room
Cooling test	DB27˚C / WB19˚C	DB35˚C / WB24˚C
Heating test	DB20˚C / WB15˚C	DB 7˚C / WB 6˚C

1-2 Pressure Graph

■ SH09BPH



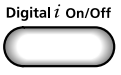
■ SH12BPH



2. Operating Instructions

2-1 The Feature of Key in remote control

No	NAMED OF KEY	FUNCTION OF KEY
1	(On/Off)	On/Off button. Press the button to stop or run the air conditioner.
2	(UP)	Temperature adjustment button(UP). To increase the temperature by the pressing the temperature button.
	(DOWN)	Temperature adjustment button(DOWN). To decrease the temperature by the pressing the temperature button.
3	Mode	Mode selection button. Each time you press this button Mode is changed in the following order Auto → ❄ → 💧 → ✣ → ☀ Auto : Auto Mode ✣ : Fan Only ❄ : Cool Mode ☀ : Heat Mode 💧 : Dry Mode
4		Fan speed adjustment button. Each time you press this button, FAN SPEED is changed in the following order. Low → Medium → High Automatic(rotated : → → →)
5		Swing button. It adjusts the airflow to upward and downward.
6	TURBO	Turbo button. The air conditioner cools or heats the room as quickly as possible. After 30 minutes, the air conditioner is reset automatically to the previous mode.
7		Sleep button. The sleep timer can be used when you are cooling or heating your room to switch the air conditioner off automatically after a period of 6 hours.
8		Anion button. Press the button to generate ion from the air conditioner.

No	NAMED OF KEY	FUNCTION OF KEY
9		On Timer button. The On Timer enables you to **switch on** the air conditioner automatically after a given period of time that is from 30 minutes to 24 hours. To set the operating time, press the button one or more times until the required time display.
10		Off Timer button. The Off Timer enables you to **switch off** the air conditioner automatically after a given period of time that is from 30 minutes to 24 hours. To set the operating time, press the button one or more times until the required time display.
11		Timer Set/Cancel button. After setting On Timer or Off Timer, press the button to set it completely. And press the button again to cancel On Timer or Off Timer set.
12		Digital *i* On/Off button. If you want to turn off the display during operation press the button.

2-1-1 Name & Function of Key in remote control

1. AUTO MODE : In this mode, operation mode(COOL, HEAT) is selected automatically by the room temperature of initial operation.

Room Temp	Operation Type
Tr≥ 21°C+ΔT	Cool Operation (Set Temp:24˚C+ΔT)
21°C +ΔT>Tr	Heat Operation (Set Temp:22˚C+ΔT)

   ΔT= -1°C, -2°C, 0°C, +1°C, +2°C
   ΔT is controlled by setting temperature up/down key of remote control

2. COOL MODE : The unit operates according to the difference between the setting and room temperature. (18°C~30°C)

3. HEAT MODE : The unit operates according to the difference between the setting and room temperature.(16°C~30°C)
   *Prevention against cold wind : In order to prevent the cool air from flowing out at the heat mode, the indoor fan does not operate or operates very slowly in the following cases. At this time, the indoor heat exchanger will be preheating.
   - For 3~5 minutes after the initial operation
   - For deicing operation
   - The operation of an indoor fan in accordance with the temperature of an indoor heat exchanger

The temperature of indoor heat exchanger	Indoor fan speed
below 28˚C	off
28˚C~below 34˚C	LL Speed
34˚C~below 40˚C	L Speed
above 40˚C	Setting Speed

   *High temperature release function : It is a function to detect an outdoor overload by the sensor of an indoor heat exchanger and to turn the outdoor fan or the compressor ON/OFF for safety.
   *Deice : Deicing operation is controlled by indoor unit's heat exchanger temperature and accumulating time of compressor's operation.
   Deice ends by sensing of the processing time by deice condition.

4. DRY MODE : Has 3 states, each determined by room temperature.
   The unit operates in DRY mode.
   *Compressor ON/OFF Time is controlled compulsorily (can not set up the fan speed, always breeze).
   *Protective function : Low temperature release. (Prevention against freeze)

5. TURBO MODE : This mode is available in AUTO, COOL, HEAT, DRY, FAN MODE.
   When this button is pressed at first, the air conditioner is operated "powerful" state for 30 minutes regardless of the set temperature, room temperature.
   When this button is pressed again, or when the operating time is 30 minutes, turbo operation mode is canceled and returned to the previous mode.
   *But, if you press the TURBO button in DRY or FAN mode that is changed with AUTO mode automatically.

6. SLEEP MODE : Sleep mode is available only in COOL or HEAT mode.
   The operation will stop after 6 hours.
   *In COOL mode : The setting temperature is automatically raised by 1°C each 1hour When the temperature has been raised by total of 2°C, that temperature is maintained.
   *In HEAT mode : The setting temperature is automatically dropped by 1°C each 1hour.
   When the temperature has been dropped by total of 2°C, that temperature is maintained.

7. FAN SPEED : Manual (3 step), Auto (4 step)
   Fan speed automatically varies depending on both the difference between setting and the room temperature.

8. COMPULSORY OPERATION :
   For operating the air conditioner without the remote control.
   *The air conditioner starts up in the most suitable mode for the room temperature:

Room Temperature	Operating Mode	Temperature Setting
Less than 21˚C	Heat	22˚C approx.
21˚C or above	Cool	24˚C approx.

9. SWING : BLADE-H is rotated vertically by the stepping motor.
   *Swing Set : Press the button under the remote control is displayed on LCD the and the blades move up and down. If the one more time press the button, blades location is stop.

10. SETTING THE ON/OFF TIMER. :
   *ON TIMER : The On Timer enables you to switch on the air conditioner automatically after a given period of time. You can set the period of time from 30 minutes to 24 hours.
   *OFF TIMER : The Off Timer enables you to switch off the air conditioner automatically after a given period of time. You can set the period of time from 30 minutes to 24 hours.

11. GENERATING ANION :
   The air conditioner can generate anion with an ionizer in the indoor unit.

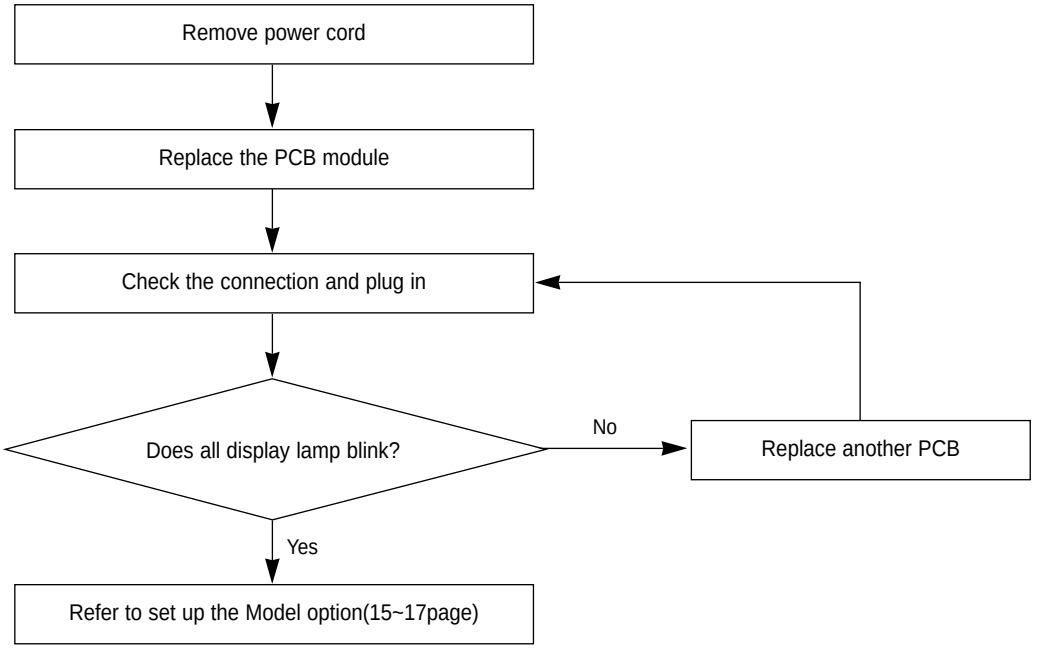
12. SELF DIAGNOSIS

Error Mode	DISPLAY 7-SEGMENT		Remark
	Operation Off	Operation On	
Indoor unit room temperature sensor error (open or short)	OFF	E1	
Indoor unit heat exchanger temperature sensor error(open or short)	OFF	E5	
Indoor FAN MOTOR error : Keep the RPM value 100 below for 15 seconds	OFF	E3_01	
EEPROM error	OFF	06	
Error in option In case of No option set-up In case of option data error	OFF	09	
Communication error	EA_01	EA_01	

13. BUZZER SOUND : Whenever the On/Off button is pressed or whenever change occurs to the condition which is set up or select, the compulsory operation mode, buzzer is sounded "beep".

2-2 Replace PCB Model option

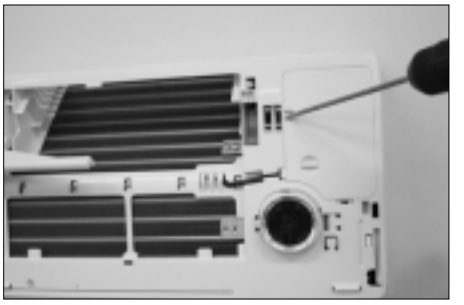
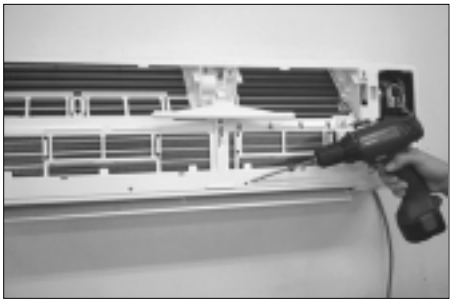
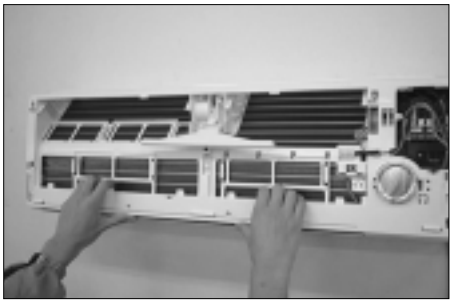
2-2-1 Replace PCB model option

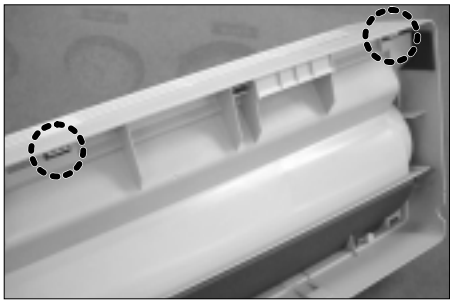
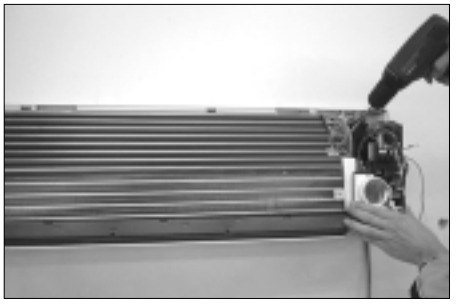
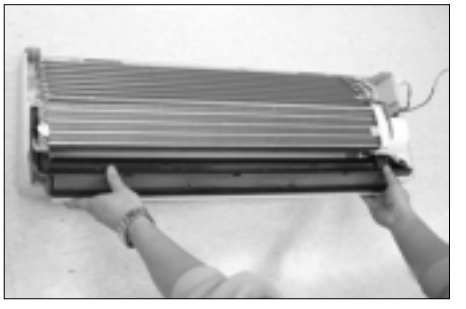


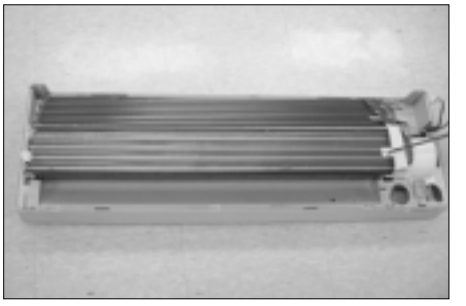
3. Disassembly and Reassembly

Stop operation of the air conditioner and remove the power cord before repairing the unit.

3-1 Indoor Unit

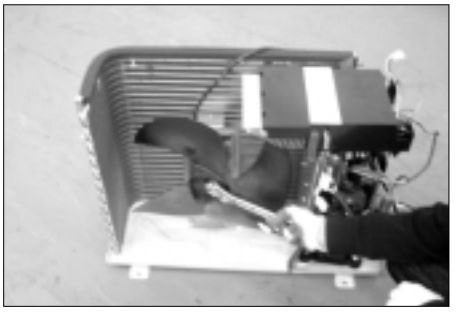
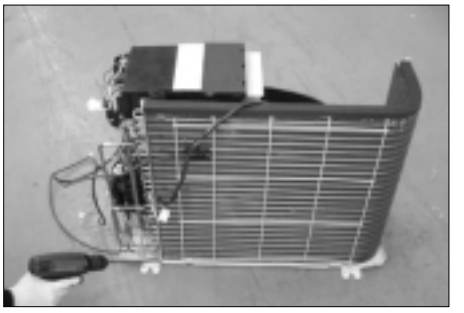
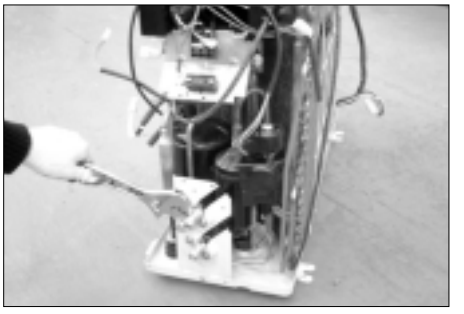
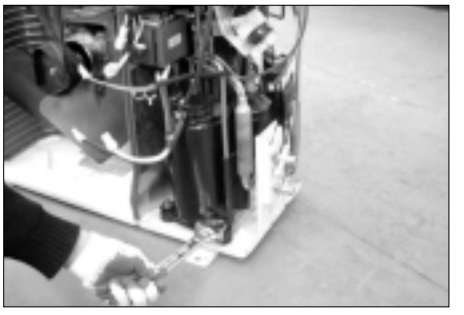
No	Parts	Procedure	Remark
1	Front Panel	1) Stop the air conditioner operation and block the main power. 2) Detach tape of Front Panel upper.	
		3) Slide the lower Front Grille down, then disassemble it by pulling it forwards. 4) Open the upper Front Grille by pulling right and left sides of the Grille. 5) Take the left and right Filter out. 6) Loosen one of the right screw and detach the Terminal Cover. 7) Detach the thermistor from the Front Grille.	
		8) Loosen 5 fixing screws of Front Grille.	
		9) Pull the lower left and right of discharge softly for the outside cover to be pulled out.	

No	Parts	Procedure	Remark
		10) At first, press the left and center hook of the back side of the Panel Grille with the thumb to remove the hook. And press the right of the upper side of the Panel Grille with the fingers. And then disassemble the Panel Grille.	
2	Electrical Parts (Main PCB)	1) Take all the connector of PCB upper side out.(Including Power Cord) 2) Detach the outdoor unit connection wire from the Terminal Block. 3) If pulling the main PCB up, it will be taken out.	
3	Tray Drain	1) Pull Tray Drain out from the Back Body.	

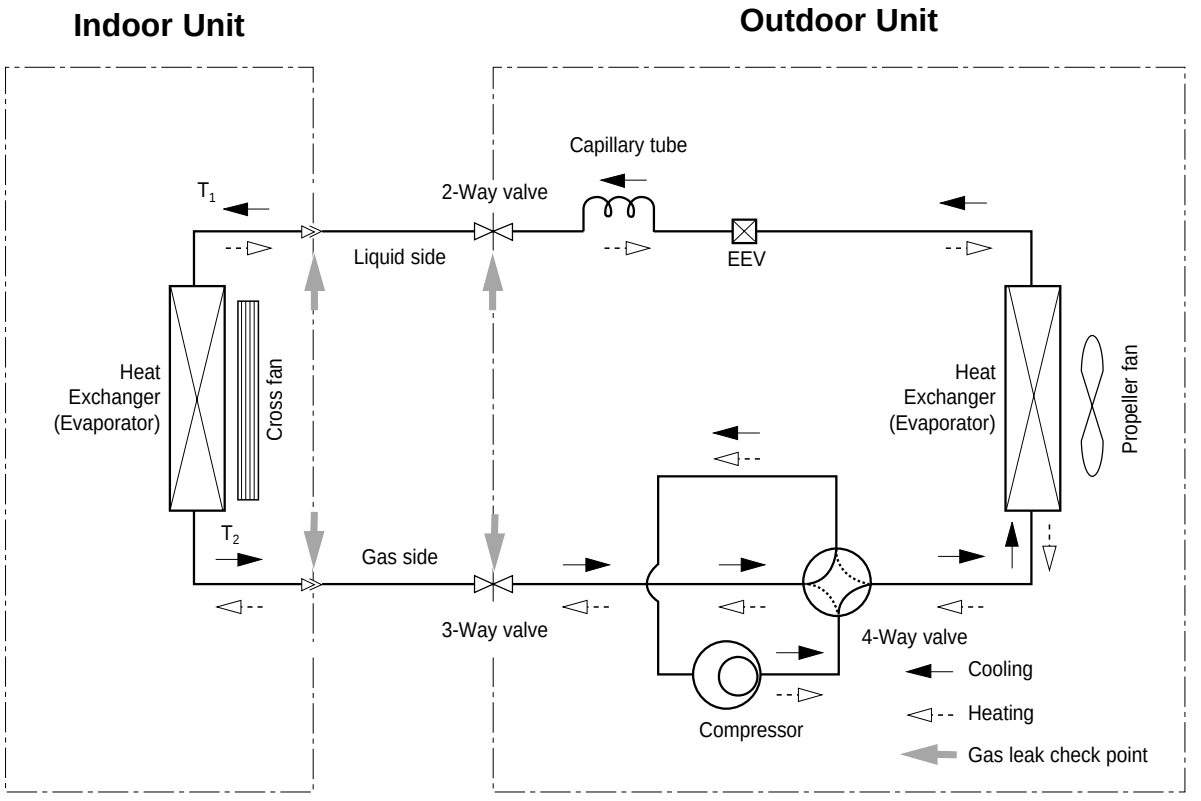
No	Parts	Procedure	Remark
4	Heat Exchanger	1) Loosen 2 fixing earth screws of right side. 2) Detach the Connection Pipe. 3) Detach the Holder Pipe at the rear side. 4) Loosen 3 fixing screws of right and left side. 5) Detach the Heat Exchanger from the indoor unit.	
5	Fan Motor & Cross Fan	1) Loosen 2 fixing screws and separate the Motor Holder. 2) Loosen 1 fixing screw of Fan Motor. (with a M3 wrench) 3) Detach the Fan Motor from the Fan. 4) Detach the Fan from the left Holder Bearing.	

3-2 Outdoor Unit

No	Parts	Procedure	Remark
1	Common Work	1) Loosen each 3 fixing screws on both right and left Cabinet-Side edge and a fixing screw on the Cabinet-Front lower to detach the Cabinet-Front.	
		2) Loosen 1 fixing screws of the Cover-Valve.	
		3) Loosen 6 fixing screws of the Cabinet-Side RH.	
		4) Loosen 2 fixing screws of the Cabinet-Side LF.	

No	Parts	Procedure	Remark
2	Fan & Motor	1) Detach the Nut Flange.(Turn counterclockwise because the screw is right-handed) 2) Detach the Fan. 3) Loosen 4 fixing screws to detach the Motor.	
3	Heat Exchanger	1) Loosen 2 fixing screws on both sides. 2) Disassemble the pipe in both inlet and outlet with welding torch. 3) Detach the Heat Exchanger.	 
4	Compressor	1) Loosen the Terminal Cover nut to open the Terminal Cover. 2) Disassemble the cloth sound felt. 3) Disassemble the pipe in both inlet and outlet of the Compressor with welding torch. 4) Disassemble the pipe in both inlet and outlet of the Condenser with welding torch. 5) Loosen the 3 bolts at the bottom. 6) Detach the Compressor.	

4. Refrigerating Cycle Diagram



5. Set Up the Model Option

5-1 Setting Option Setup Method

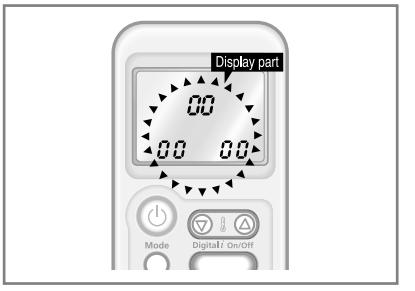
ex) Option No. : 066064- 170373

Step 1 : **Enter the Option Setup mode.**

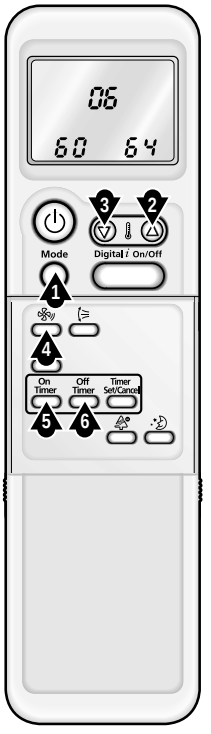
1st Take out the batteries of remote control.

2nd Press the temperature (▽ / △) button simultaneously and insert the battery again.

3rd Make sure the remocon display shown as 00 00 00.



Step 2 : **Enter the Option Setup mode and select your option according to the following procedure.**



✻ Setting is not required if you must 0 a value which has a 0 default.

1

The default value is 00 00 00.
Otherwise, push the Mode button to 0.
Every time you push the button, the display panel reads 1 or 0 repeatedly.

2

Push the (△) button to set the display panel to 6.
Every time you push the button, the display panel reads 0 ➡ 1 ➡ 2 ➡ 3 ➡ · · · 9 ➡ A ➡ b ➡ c ➡ d ➡ E ➡ F repeatedly.

3

Push the (▽) button to set the display panel to 6.
Every time you push the button, the display panel reads 0 ➡ 1 ➡ 2 ➡ 3 ➡ · · · 9 ➡ A ➡ b ➡ c ➡ d ➡ E ➡ F repeatedly.

4

Push the button to set the display panel to 0.
Every time you push the button, the display panel reads 0 ➡ 1 ➡ 2 ➡ 3 ➡ · · · 9 ➡ A ➡ b ➡ c ➡ d ➡ E ➡ F repeatedly.

5

Push the On Timer button to set the display panel to 6.
Every time you push the button, the display panel reads 0 ➡ 1 ➡ 2 ➡ 3 ➡ · · · 9 ➡ A ➡ b ➡ c ➡ d ➡ E ➡ F repeatedly.

6

Push the Off Timer button to set the display panel to 4.
Every time you push the button, the display panel reads 0 ➡ 1 ➡ 2 ➡ 3 ➡ · · · 9 ➡ A ➡ b ➡ c ➡ d ➡ E ➡ F repeatedly.

✻ Setting is not required if you must 0 a value which has a 0 default.

7 Press Mode button, then the default value is 00 10 00 .

8 Push the ▲ button to set the display panel to 7.
Every time you push the button, the display panel reads 0 ➡ 1 ➡ 2 ➡ 3 ➡ ··· 9 ➡ A ➡ b ➡ c ➡ d ➡ E ➡ F repeatedly.

9 Push the ▼ button to set the display panel to 0.
Every time you push the button, the display panel reads 0 ➡ 1 ➡ 2 ➡ 3 ➡ ··· 9 ➡ A ➡ b ➡ c ➡ d ➡ E ➡ F repeatedly.

10 Push the button to set the display panel to 3.
Every time you push the button, the display panel reads 0 ➡ 1 ➡ 2 ➡ 3 ➡ ··· 9 ➡ A ➡ b ➡ c ➡ d ➡ E ➡ F repeatedly.

11 Push the On Timer button to set the display panel to 7.
Every time you push the button, the display panel reads 0 ➡ 1 ➡ 2 ➡ 3 ➡ ··· 9 ➡ A ➡ b ➡ c ➡ d ➡ E ➡ F repeatedly.

12 Push the Off Timer button to set the display panel to 3.
Every time you push the button, the display panel reads 0 ➡ 1 ➡ 2 ➡ 3 ➡ ··· 9 ➡ A ➡ b ➡ c ➡ d ➡ E ➡ F repeatedly.

Step 3 : Upon completion of the selection, check you made right selections.

Press the Mode Selection key, Mode to set the display part to 0 and check the display part.

➡ The display part shows 60 06 64 .

Press the Mode Selection key, Mode to set the display part to 1 and check the display part.

➡ The display part shows 03 17 73 .

Step 4 : Pressing the ON/OFF button (⏻)

When pressing the operation ON/OFF key with the direction of remote controller for unit, the sound "Ding" or "Diriring" is heard and the OPERATION ICON(≋) lamp of the display is flickering at the same time, then the input of option is completed. (If the diriring sound isn't heard, try again pressing the ON/OFF button.)

Step 5 : Unit operation test-run

First, Remove the battery from the remote controller.

Second, Re-insert the battery into the remote controller.

Third, Press ON/OFF key with the direction of remote controller for set.

• Error Mode

1st If all lamps of indoor unit are flickering, Plug out, plug in battery again and press ON/OFF key to retry.

2nd If the unit is not working properly or all lamps are continuously flickering after setting the option code, see if the correct option code is set up for its model.

■ OPTION ITEMS

REMOCON / MODEL	SEG1	SEG2	SEG3	SEG4	SEG5	SEG6	SEG7	SEG8	SEG9	SEG10	SEG11	SEG12
SH09BPH	0	0	9	0	A	0	1	0	0	2	2	E
SH12BPH	0	0	7	0	9	0	1	1	0	3	6	2

6. Troubleshooting

Since the inverter air conditioner is equipped with Electrical control circuits at both Indoor & outdoor unit, the trouble shooting shall be performed according to the error mode.

Inside the controller of the outdoor unit (inverter), the large capacity of electrolytic condenser so that it takes the time to discharge after the power off since the electrical charge remains(the charging voltage DC 340V).

Take care of the electrical shock by contact on the charging part before the discharge after the power off. (It takes approximately 2 minutes to discharge).

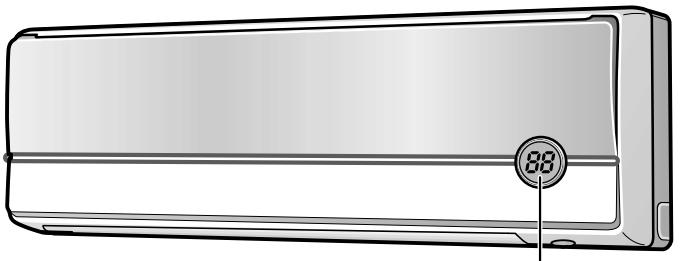
6-1 Basic items for trouble shooting

1. Is the power source proper?
   The power source shall be in the range of the rated voltage ±10%. If it is out of this range, it may cause the abnormal operation.
2. Is the connection made between the indoor and outdoor unit?
   The connection between indoor and outdoor unit shall be performed with 4 wire. (connection cable of indoor and outdoor unit + ground wire).
3. The phenomena as follows are not out of order.

No	Phenomena	Cause and reason
1	The operation is not done.	• Is the power off or the power unplugged? • Does it stop because it is the completion time? • Unplug and plug again the power source for 2 minutes.
2	The wind comes out but the heating/cooling is not performed.	• Is the filter clogged with dust or dirty? • Is there any direct light on the outdoor unit or any obstacle against it? • Is the selected temperature too high? Lower the selected temperature lower than the current one (during cooling). • Is the selected temperature too low? Raise the desired temperature than the current one? (during heating) • Is the "Fan only Mode" operation?
3	The remote controller does not operate.	• Is the battery run out? • Is the battery inserted in the wrong way(+, -)? • Is the detection part of the indoor unit blocked? • Does it interfered with the radio of neon sign?
4	The wind volume is not adjusted.	• Is the operation selected among one of Auto / Dry / Turbo / Sleeping? • The temperature setting is not required since the wind volume set automatically. • Check again at the state of Cooling / Fan only / Heating.
5	The temperature is not set.	• Is the operation selected among the Dry / Turbo / Sleeping / Fan only Mode. Since the temperature is automatically set, the temperature setting is not required. • Check again at the cooling / heating state. • The standard temperature ±2˚C during the automatic operation.
6	The operation lamp continues to be flickering.	• Push the Operation / Stop button. • Unplug and plug the power source.
7	The immediate operation starts without control of remote controller when plugged	• It is the case that the auto restart function works. ✻Auto restart function is the convenient function where the operation state is memorized in the Memory IC during the blackout and the operation restarts when the power comes back.

6-2 The first determination method of troubled part

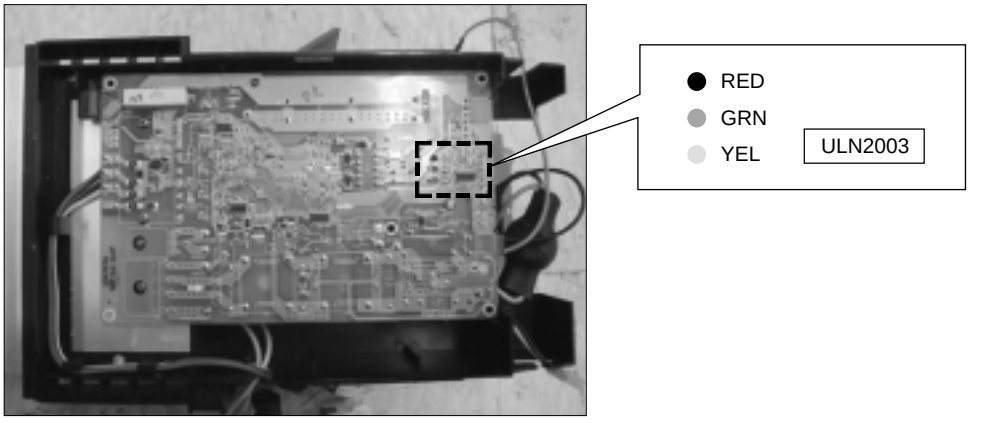
6-2-1 Error mode display of indoor unit



ERROR CODE DISPLAY	Discription	Check point	
		INDOOR	OUTDOOR
Indoor Unit			
Er↔E1	Indoor unit room temperature sensor error (open / short)	Temp-Sensor	
Er↔E5	Indoor unit heat exchanger out temperature sensor error(open / short)	Temp-Sensor	
Er↔05	Indoor unit heat exchanger in temperature sensor error(open / short)	Temp-Sensor	
Er↔06	EEPROM error	PCB	
Er↔09	Option code setting error	Option Code	
E3↔01	Indoor fan motor malfunction	Fan and cable	
Communication error or miss-wiring error			
ER↔01	Communication error between the indoor unit and outdoor unit	PCB, Cable between Indoor and outdoor unit	
Compressor protection error			
Er↔11	Abnormal increase of operation current		○
Er↔12	Abnormal increase of OLP temperature		○
Er↔13	Abnormal increase of discharge temperature		○
Er↔14	Over current of IPM circuit		Comp. Fan
Er↔15	Abnormal increase of heatsink temperature		Fan
Er↔18	BLCD compressor starting error		Comp. PCB,Comp wire
Outdoor unit sensor error (open / short)			
Er↔E6	deice temp-sensor		Temp-Sensor
Er↔31	outdoor temp-sensor		Temp-Sensor
Er↔32	discharge temp-sensor		Temp-Sensor
Er↔33	OLP temp-sensor		Temp-Sensor
Outdoor control PCB error			
Er↔17	Communication error between 2 micom on the outdoor PCB		PCB
Er↔36	current sensor error		PCB
Er↔37	heatsink temp-sensor error		PCB
Er↔38	Voltage sensor error		PCB, Outlet voltage

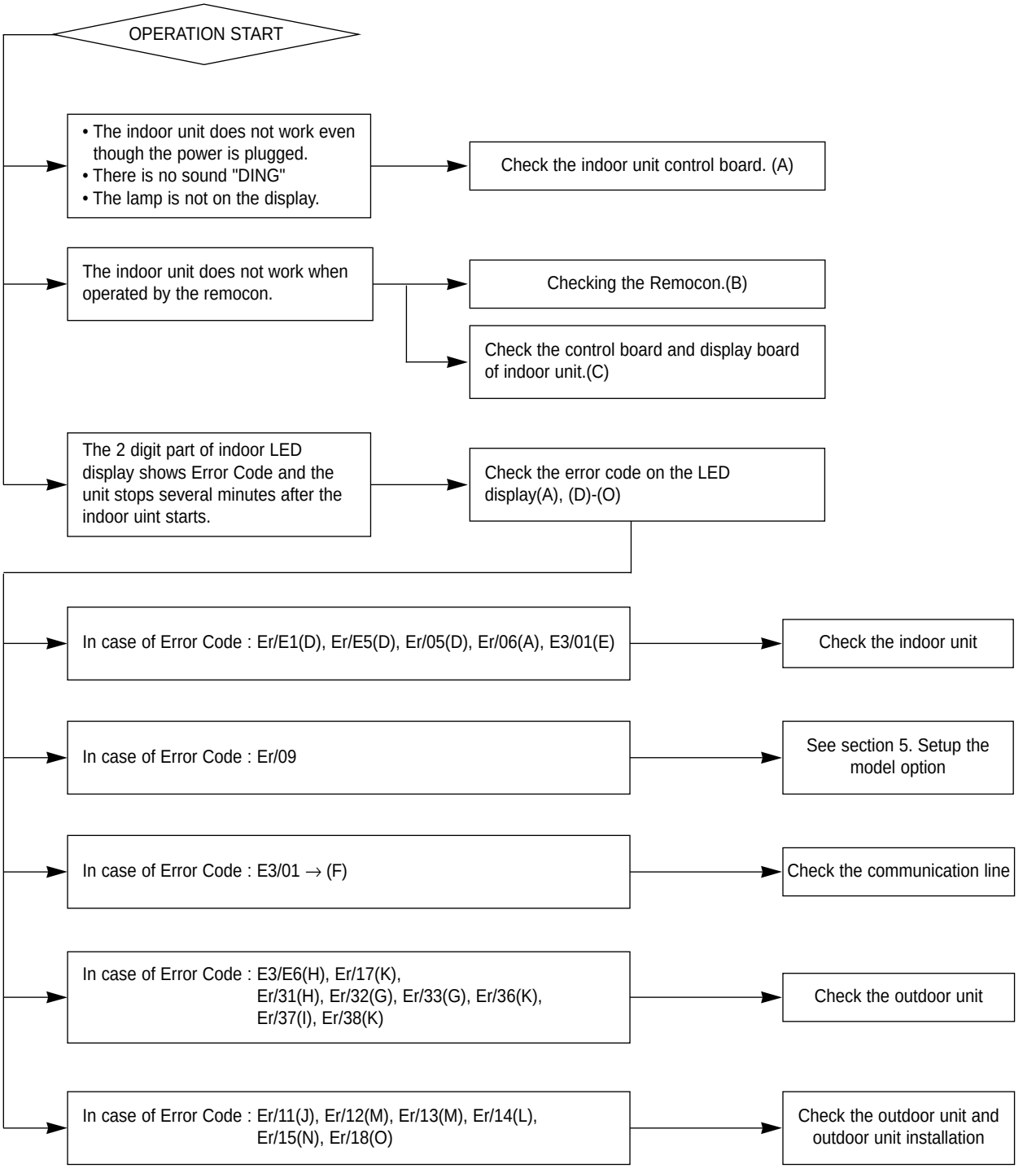
✻Error display : Er· / ER· / E3· and 2-digit-number are displayed alternately

6-2-2 Error mode display of outdoor unit board



LAMP of Display Monitor			Description ● : Lamp on ◎ : Lamp flickering X : Lamp off
YELLOW	GREEN	RED	
X	X	X	Power Off / VDD NG
X	X	◎	Comp. Peak Current (O.C.)
X	X	●	Communication NG
X	◎	X	Comp. Starting error
X	◎	◎	Heatsink sensor error
X	◎	●	Normal Operation
X	●	◎	DC-link overvoltage error
X	●	●	4-Way valve error
◎	X	X	Heatsink Temp. trip
◎	X	◎	Outdoor Sensor error(Open/Short)
◎	X	●	Discharge sensor temp. trip
◎	◎	X	Discharge sensor error(Open/Short)
◎	◎	◎	OLP sensor error(Open/Short)
◎	◎	●	CT sensor error
◎	●	X	Unit Over Current protection
◎	●	◎	Deice sensor error(Open/Short)
◎	●	●	OLP sensor temp. trip
●	X	◎	OPTION error (EEPROM)
●	X	●	Compressor rotation error
●	◎	X	DC fan error (SH12BWHX only)
●	◎	◎	DC-Link voltage sensor error
●	◎	●	PFC OC error
●	●	X	NO GAS error
●	●	◎	AC Line zero-crossing error

6-3 Sequence of trouble shooting for inverter aircon


OPERATION START
• The indoor unit does not work even though the power is plugged.
• There is no sound "DING"
• The lamp is not on the display.
Check the indoor unit control board. (A)
The indoor unit does not work when operated by the remocon.
Checking the Remocon.(B)
Check the control board and display board of indoor unit.(C)
The 2 digit part of indoor LED display shows Error Code and the unit stops several minutes after the indoor uint starts.
Check the error code on the LED display(A), (D)-(O)
In case of Error Code : Er/E1(D), Er/E5(D), Er/05(D), Er/06(A), E3/01(E)
Check the indoor unit
In case of Error Code : Er/09
See section 5. Setup the model option
In case of Error Code : E3/01 → (F)
Check the communication line
In case of Error Code : E3/E6(H), Er/17(K), Er/31(H), Er/32(G), Er/33(G), Er/36(K), Er/37(I), Er/38(K)
Check the outdoor unit
In case of Error Code : Er/11(J), Er/12(M), Er/13(M), Er/14(L), Er/15(N), Er/18(O)
Check the outdoor unit and outdoor unit installation

6-3-1 (A) Check of indoor unit control board

▶ Unplug the power cord and plug it after 5 seconds.

▶ Press the on/off switch located indoor unit inside to operate the air conditioner.

- If the air conditioner operates, check the remocon and indoor unit display board.
- If the air conditioner does not operates, check according to the sequence of the followings:

▶ Check sequence of indoor unit control board

Step 1 : Check whether two wires of power cord (Sky-blue, brown) are connected correctly to the terminal block and Relay on the control board.

- Sky -blue : connected to "N1" of Terminal block
- Brown : connected to RY71 Tab terminal (control board outer side)

Step 2 : Check whether the wire connected to the terminal block is connected to th control board.

(Control board)		(Terminal block)
CN71	SKY-BLU	(N1)
RY71	BRN	1
CN71	BLK	2

Step 3 : Check whether the fuse (F701)(F702) on the control board is normal. (3.15[A]/250[V]:F701) (1[A]/250[V]:F702)

- If the fuse is broken, replace it with new one.

Step 4 : Check the output voltage of SMPS on the control board.

- Input power AC178 ~ AC 264V— • CN22 1-3pin : DC12V
  CN22 2-3pin : DC5V

※CN22 : As socket not mounted measure at the solder points

Step 5 : Check whether the control board gets wet with dew

- Dry the control board.

Step 6 : Check whether tiny metal objects make a short fircuit on the PCB, especially between pins of the surface mount IC.

- remove the objects. Do not use splay solvent or some components may get damage by solvent.

6-3-2 (B)(C) Display board and remocon check of indoor unit

▶ Check whether the connection wire of Display board is correctly connected to CN53 connector.

▶ Check the voltage of remocon battery. - the voltage of one battery shall be higher than about 1.4V, and then the remocon operates normally.

▶ Check whether the neon sign is on and the 3 wave long fluorescent lamp is on around the indoor unit. - After putting all lamps of the indoor out and then operate it by remocon. If it operates with the remocon, it is the abnormality due to the interference from the light of lamps. (Aircon unit is normal).

6-3-3 (D) Check the indoor temperature sensor and indoor heat exchanger temperature sensor.

Take out the thermistor connected to the connector (CN41,CN42) of control board of indoor unit and measure the resistance between two wires and if it is same as follows: it is normal but if not, replace it.

Ambient temperature (°C)	15°C	20°C	25°C	30°C	35°C	40°C	
Resistance of thermistor [KΩ]	14.68	12.09	10	8.31	6.94	5.83	

6-3-4 (E) Check of indoor unit fan motor

▶ Check whether the wires are connected surely between control board(CN72) and running capacitor(Tab).
▶ Check whether the wire of fan motor is connected to the control board (CN73,CN74) of indoor unit.
▶ Check whether the error mode displays after the strong rotation for approximately 15 seconds since air conditioner turned on.
- In case the error code displays after the fan motor is rotating for 15 seconds. → Defect of HALL IC of fan motor and/or control board.
- In case that error code displays without fan motor rotating after 15 seconds. → Operate with making short circuit of AC side pins of SSR(SS71) of indoor unit control board. And then if the fan motor does not operate, it is the fan motor defect.
  If it rotates, it is the defect of control board(SS71,IC05,IC04).

6-3-5 (F) Check of communication line between the indoor unit and outdoor unit

■ Communication error mode

1. Check of connection

▶ Check whether the cable wire connecting the indoor unit with outdoor unit is correctly connected to the (N1), 1, 2 terminal. (If the wire is connected reversely, the communication error occurs)
▶ If the cable connecting the indoor unit and outdoor unit is longer than 20m, error mode may occur (shorten the cable length).

■ Check of indoor unit

▶ Check whether the connection wire of the terminal block and control board of indoor unit is correct.

(Control board)		(Terminal block)
CN71	SKY-BLU	(N1)
RY71	BRN	1
CN71	BLK	2

■ Check of outdoor unit

▶ Check whether the connection wire of the terminal block and control board of outdoor unit is correct.

(Control board)		(Terminal block)
TB-N	SKY-BLU	(N1)
TB-L	BRN	1
CN04	BLK	2

2. Check of power supply to the outdoor unit

After operation of aircon, select the turbo mode and approximately 3minutes later, check whether the red color lamp of control board (to be seen if the top cover of outdoor unit) is on.
→ If the red lamp (LED 3) is not on, check the power part of control board of outdoor unit.
• Check the connection of reactor.
→ If the red lamp (LED 3) is on and green lamp is flickering, it is normal.

6-3-6 (G) Check of discharge temperature sensor and comp top OLP temperature sensor.

▶ Connector of outdoor unit control board
(PIN#3,4 of CN51 - discharge temperature sensor), (PIN#1,2 of CN52-OLP Temperature sensor)
Measure the resistance between two wires and if it is same as follows, it is normal but if not, replace.

Ambient temperature (°C)	0°C	10°C	20°C	30°C	40°C	50°C	
Resistance of thermistor [KΩ]	553	362	242	166	165	82	

6-3-7 (H) Check the defrost temperature sensor and outdoor temperature sensor.

▶ Connector of outdoor unit control board
(PIN#1,2 of CN51 - outdoor temperature sensor),(PIN#3,4 of CN52-deice Temperature sensor)
Measure the resistance between two wires and if it is same as follows, it is normal but if not, replace it.

Ambient temperature (°C)	15°C	20°C	25°C	30°C	35°C	40°C	
Resistance of thermistor [KΩ]	14.68	12.09	10	8.31	6.94	5.83	

6-3-8 (I) Check the heatsink temperature sensor of IPM

▶ This sensor is inside of the IPM module and PIN#24,25 of IPM module are the sensor terminal.
Usually PIN solder crack or short circuit with small metal object cause sensor error.
Check the object to make short circuit and solder condition of these pins.

Ambient temperature (°C)	15°C	20°C	25°C	30°C	35°C	40°C	
Resistance of thermistor [KΩ]	77.4	61.4	49.1	39.5	31.9	26	

6-3-9 (J) Check of operation current abnormal increase mode

▶ The operation abnormal current mode is the protection control for the safe operation by detecting the operation current of inverter aircon by the current sensor on the control board.
▶ If the operation current abnormal increase occurs,
• The ventilation is not good because the outdoor unit is installed wrong (the ambient temperature is higher than 50 °C)
→ Reinstall the outdoor unit so that the good ventilation can be made.
• If the Refrigerant is overcharged.
→ Check the amount of Refrigerant.
• If the comp is locked.
→ Replace the comp.
• If the comp is operating without the revolution of fan motor.
→ Check the fan motor connector, replace the fan motor.
• If the protection cover is operating with bending to the outdoor.
→ Take out the protection cover.
• If two outdoor units are operating face to face. (the bad ventilation is made)
→ Reinstall the outdoor unit for the good ventilation.
• The air circulation is bad due to the attachment of falling leaves
→ Take away the leaves for the good ventilation.
▶ Check and clean the dirt of current sensor block of outdoor control board.
especially • IC83 pin solder • C437 47uF • R459 33K • R461 4.7K

6-3-10 (K) Check of Current sensor, Voltage sensor and Communication between 2 micom on the board.

▶ These errors are from component trouble on the outdoor control board.
→ Replace the outdoor control board

6-3-11 (L) Check of instantaneous over-current protection of IPM circuit.

▶ Inverter instantaneous over-current protection mode is the mode to be actuated in order to prevent the damage of elements from the peak current of IPM circuit elements.

▶ In case that the inverter circuit instantaneous over-current protection mode actuates.

■ condition of installation

- The ventilation is not good because the outdoor unit is installed wrong (the ambient temperature is higher than 50 (°C))
  → Reinstall the outdoor unit so that the good ventilation can be made.
- In case that the operation is made with the cover bent of the outdoor unit.
  → Take out the cover.
- If two outdoor units are operating face to face, (the bad ventilation is made)
  → Reinstall the outdoor unit for the good ventilation.
- The air circulation is bad due to the attachment of falling leaves.
  → Take away the leaves for the good ventilation.
- If the Refrigerant is overcharged.
  → Check the amount of Refrigerant.

■ Unit defect

- If the comp is locked.
  → Replace the comp.
- If the comp is operating without the revolution of fan motor.
  → Check the fan motor connector and replace the fan motor.
- In case the parts of the control board is damaged.
  → Replace the outdoor control board.

6-3-12 (M) Check of the comp discharge gas temperature and OLP temperature abnormal rise.

▶ If the comp discharge gas temperature and OLP temperature rises higher than a certain level, it protects the circuit.

▶ If the comp discharge gas temperature and OLP temperature rises abnormally,

■ Condition of installation

- The ventilation is not good because the outdoor unit is installed wrong (the ambient temperature is higher than 50 (°C))
  → Reinstall the outdoor unit so that the good ventilation can be made.
- In case that the operation is made with the cover bent of the outdoor unit.
  → Take out the cover.
- If two outdoor units are operating face to face, (the bad ventilation is made)
  → Reinstall the outdoor unit for the good ventilation.
- The air circulation is bad due to the attachment of falling leaves
  → Take away the leaves for the good ventilation.
- If the refrigerant is insufficient.
  → Fill up the amount of refrigerant.

■ Unit defect

- If the comp is locked.
  → Replace the comp.
- If the comp is operating without the revolution of fan motor
  → Take out the protection cover.
  → Check the fan motor connector and replace the fan motor.

6-3-13 (N) Check of the heatsink temperature abnormal rise

▶ If the air flow around the heatsink on the control box is not good, heatsink temperature will go up and the control box will have damage. So controller check the heatsink temperature and protect at the cirtain limit.
Possible troubles are fan motor trouble, fan motor drive circuit trouble and air flow blocking.

■ Condition of installation

- The ventilation is not good because the outdoor unit is installed wrong (the ambient temperature is higher than 50(˚C)).
  → Reinstall the outdoor unit so that the ventilation can be made.
- In case that the operation is made with the cover bent of the outdoor unit.
  → Take out the cover.
- If two outdoor unit are operatong face to face,(the bad ventilation is made)
  → Reinstall the outdoorunit for the good ventilation.
- The air circulation is bad due to the attachement of falling leaves.
  → Take away the leaves for the good ventilation.
- If the refrigerant is insufficient.
  → Fill up the amount of refrigerant.

■ Unit defect

- If the fan is locked with some object.
  → Remove the object.
- If the comp is operationg without the revolution of fan motor.
  → Take out the protection cover
  → Check the fan motor connector(CN54), running capacitor, relay(RY503) and replace the fan motor.

6-3-14 (O) Check BLDC compressor starting error

▶ If the compressor have some trouble inside like locking or gas pressure of suction and discharge pipe is not balanced, Inverter system will give up compressor rotation control to protect itself from overcurrent.

▶ In case of compressor rotation starting trouble without overcurrent condition, controller detect the compressor rotation error and stop.

- Compressor wire connection is not good.
  → Check Compressor TAB terminal connection of the wire and connector to control box.
- Gas pressure balance is not good at stop condition.
  → Check service valve open.
  → Check EEV motor attachement and connector.
- Compressor is locked or have some mechanical damage.
  → Replace the compressor.

6-3-15 (P) Check no gas error

Charge standard amount of refrigerant.

6-3-16 (Q) Check of 4-Way valve

Check whether the wires of 4-Way valve and control board of outdoor units correct.
If it is normal, replace 4-Way valve.

6-3-17 (R) Check of outdoor unit fan motor (SH12BPHX only)

Check whether the wire of fan motor is connected to the control board (CN01) of outdoor unit.
Check the voltage on the control board of outdoor unit and if it is same as follows, replace fan motor.
Input power AC178V~AC264V.
→ CN01 1-3pin : DC250V±10% ~ DC370V±10%
→ CN01 4-3pin : DC15V

6-4 Fault Diagnosis of Major Parts

<table>
<tr><th>Part</th><th colspan="2">Diagnosis</th></tr>
<tr><td rowspan="3">• Indoor "Temp.Sensor"
• Indoor "Heat ex. Sensor"
• Outdoor "Temp.Sensor"
• Outdoor "Deice Temp. Sensor"</td><td colspan="2">Measure resistance with a tester.</td></tr>
<tr><td>Normal</td><td>
<table>
<tr><td>Ambient temperature</td><td>15°C</td><td>20°C</td><td>25°C</td><td>30°C</td><td>35°C</td><td>40°C</td></tr>
<tr><td>Resistance of thermistor[KΩ]</td><td>14.68</td><td>12.09</td><td>10</td><td>8.31</td><td>6.94</td><td>5.83</td></tr>
</table>
</td></tr>
<tr><td>Abnormal</td><td>∞, OΩ … open or short</td></tr>
<tr><td rowspan="3">• Outdoor "Discharge Temp.Sensor"
• Outdoor "OLP Temp.Sensor"</td><td>Normal</td><td>
<table>
<tr><td>Ambient temperature</td><td>0°C</td><td>10°C</td><td>20°C</td><td>30°C</td><td>40°C</td><td>50°C</td></tr>
<tr><td>Resistance of thermistor[KΩ]</td><td>553</td><td>362</td><td>242</td><td>166</td><td>165</td><td>82</td></tr>
</table>
</td></tr>
<tr><td>Abnormal</td><td>∞, OΩ … open or short</td></tr>
<tr><td rowspan="5">Indoor Fan Motor</td><td colspan="2">Measure the voltage between terminals (CN72) with a tester</td></tr>
<tr><td>Normal</td><td>At ambient temperature (10°C ~ 30°C)
<table>
<tr><td>between</td><td>Voltage[V]</td><td></td></tr>
<tr><td>Red, Blue</td><td>410±10%</td><td>Main</td></tr>
<tr><td>Red, Yellow</td><td>325±10%</td><td>Sub</td></tr>
</table>
</td></tr>
<tr><td>Abnormal</td><td></td></tr>
<tr><td colspan="2">Measure the voltage between ground and signal wire of the fan motor</td></tr>
<tr><td>Normal</td><td>
<table>
<tr><td>between</td><td>Voltage</td></tr>
<tr><td>Gray, Orange</td><td>0.5V~4.5V</td></tr>
<tr><td>Yellow, Orange</td><td>5V</td></tr>
</table>
</td></tr>
<tr><td>Abnormal</td><td>Abnormal if voltage does not change from 0V to 5V.</td></tr>
<tr><td rowspan="2">Outdoor Fan Motor</td><td>Normal</td><td>At ambient temperature (10°C ~ 30°C)
<table>
<tr><td>between</td><td>Resistance[Ω]</td><td></td></tr>
<tr><td>Black, Red</td><td>275±10%</td><td>Main</td></tr>
<tr><td>Black, Yellow</td><td>350±10%</td><td>Sub</td></tr>
</table>
</td></tr>
<tr><td>Abnormal</td><td>∞, OΩ … open or short</td></tr>
<tr><td rowspan="3">Stepping Motor
(UP/DOWN swing motor)</td><td colspan="2">Measure resistance between red wire and each terminal.</td></tr>
<tr><td>Normal</td><td>Approx. 290Ω at ambient temperature (20°C ~30°C)</td></tr>
<tr><td>Abnormal</td><td>∞, OΩ … open or short</td></tr>
<tr><td rowspan="3">Stepping Motor
(FRONT GRILLE motor)</td><td colspan="2">Measure resistance between red wire and each terminal.</td></tr>
<tr><td>Normal</td><td>Approx. 110Ω at ambient temperature (20°C ~30°C)</td></tr>
<tr><td>Abnormal</td><td>∞, OΩ … open or short</td></tr>
</table>

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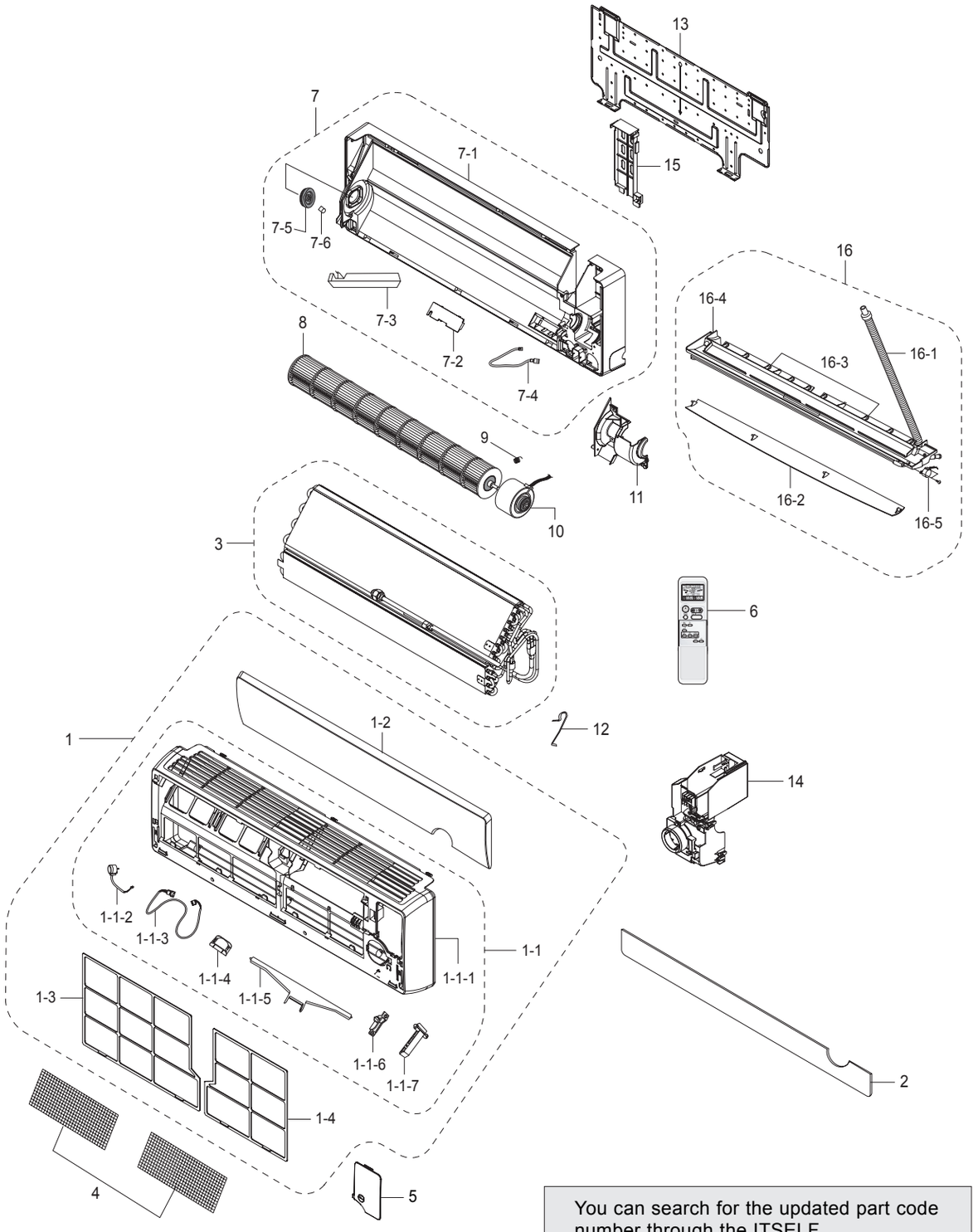
7. Exploded Views and Parts List

7-1 Indoor Unit



You can search for the updated part code number through the ITSELF.

URL : http://itself.sec.samsung.co.kr

■ **Parts List**

No.	Code No.	Description	Specification	Q'TY		Remark
				SH09BPH	SH12BPH	
1	DB92-00488C	ASS'Y PANEL FRONT-TOTAL	ASS'Y	1	1	
1-1	DB92-00392F	ASS'Y PANEL FRONT-SUB P	ASS'Y	1	1	
1-1-1	DB92-00346A	ASS'Y PANEL FRONT	ASS'Y	1	1	
1-1-2	DB31-00166A	MOTOR STEP	-	1	1	
1-1-3	DB39-00794A	CONNECTOR WIRE-STEP MOTOR	-	1	1	
1-1-4	DB61-01114A	HOLDER-MOTOR DC	HIPS	1	1	
1-1-5	DB61-01115A	HINGE-GRILLE	HIPS	1	1	
1-1-6	DB61-01116A	GUIDE-LINK	HIPS	1	1	
1-1-7	DB66-00364A	LINK-MOTOR	ABS	1	1	
1-2	DB64-00494B	GRILLE-UP	ABS	1	1	
1-3	DB63-00585C	FILTER-PRE LF	PP	1	1	
1-4	DB63-00586C	FILTER-PRE RH	PP	1	1	
2	DB92-00491B	ASS'Y GRILLE-LOW SUB	ASS'Y	1	1	
3	DB96-04189A	ASS'Y EVAP-TOTAL	ASS'Y	1	1	
4	DB95-00367B	ASS'Y-FILTER BIO	ASS'Y	1	1	
5	DB63-00581A	COVER TERMINAL	HIPS	1	1	
6	DB93-02531N	ASS'Y REMOCON	ASS'Y	1	1	
7	DB94-00304H	ASS'Y BACK BODY-SUB	ASS'Y	1	1	
7-1	DB61-01335A	BACK-BODY	HIPS	1	1	
7-2	DB63-00580A	COVER-IONIZER	HIPS	1	1	
7-3	DB91-00264A	ASS'Y ELECTRIC-IONS	ASS'Y	1	1	
7-4	DB39-01451C	ASS'Y CONNECTOR WIRE-ION	ASS'Y	1	1	
7-5	DB73-00128A	RUBBER-BEARING	-	1	1	
7-6	DB94-40007A	ASS'Y BEARING-MOTOR	-	1	1	
8	DB94-00020E	ASS'Y-CROSS FAN	ASS'Y	1	1	
9	6009-001001	BOLT SPECIAL	-	1	1	
10	DB31-00152B	MOTOR FAN	-	1	1	
11	DB61-01099A	HOLDER-MOTOR	PP	1	1	
12	DB67-60030A	SPRING-SENSOR	STS301	2	2	
13	DB70-00276A	PLATE-HANGER	SGCC-M	1	1	
14	DB93-02583B	ASS'Y CONTROL IN	ASS'Y	1	1	
15	DB90-00992A	ASS'Y HOLDER-PIPE	ASS'Y	1	1	
16	DB94-00305H	ASS'Y TRAY DRAIN	ASS'Y	1	1	
16-1	DB94-00062E	ASS'Y DRAIN-HOSE	ASS'Y	1	1	
16-2	DB61-01103A	BLADE-H	HIPS	1	1	
16-3	DB61-01104A	BLADE-V	PP	2	2	
16-4	DB63-00587A	TRAY DRAIN	HIPS	1	1	
16-5	DB95-20138A	ASS'Y MOTOR-STEPPING	ASS'Y	1	1	

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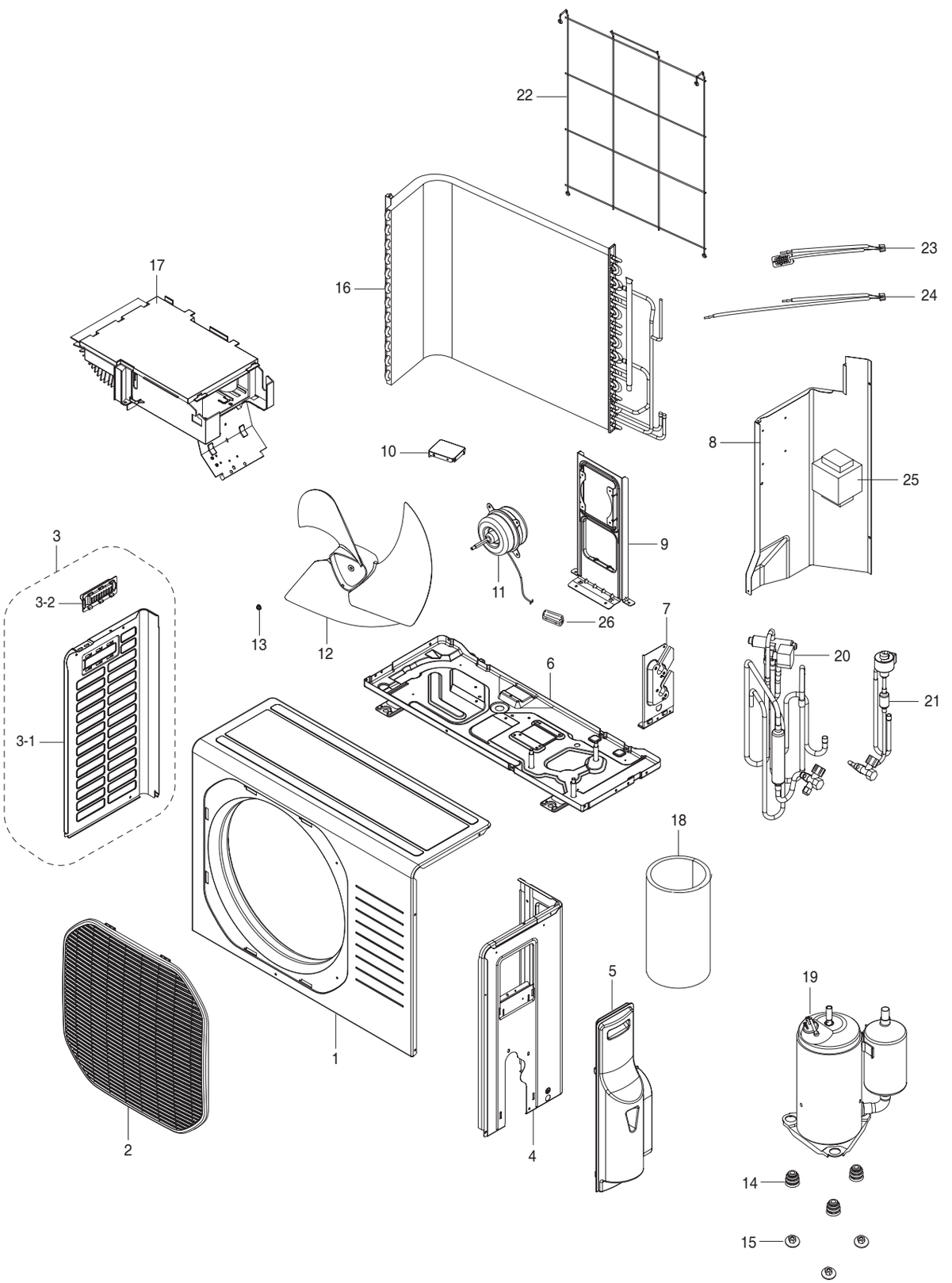
7-2 Outdoor Unit



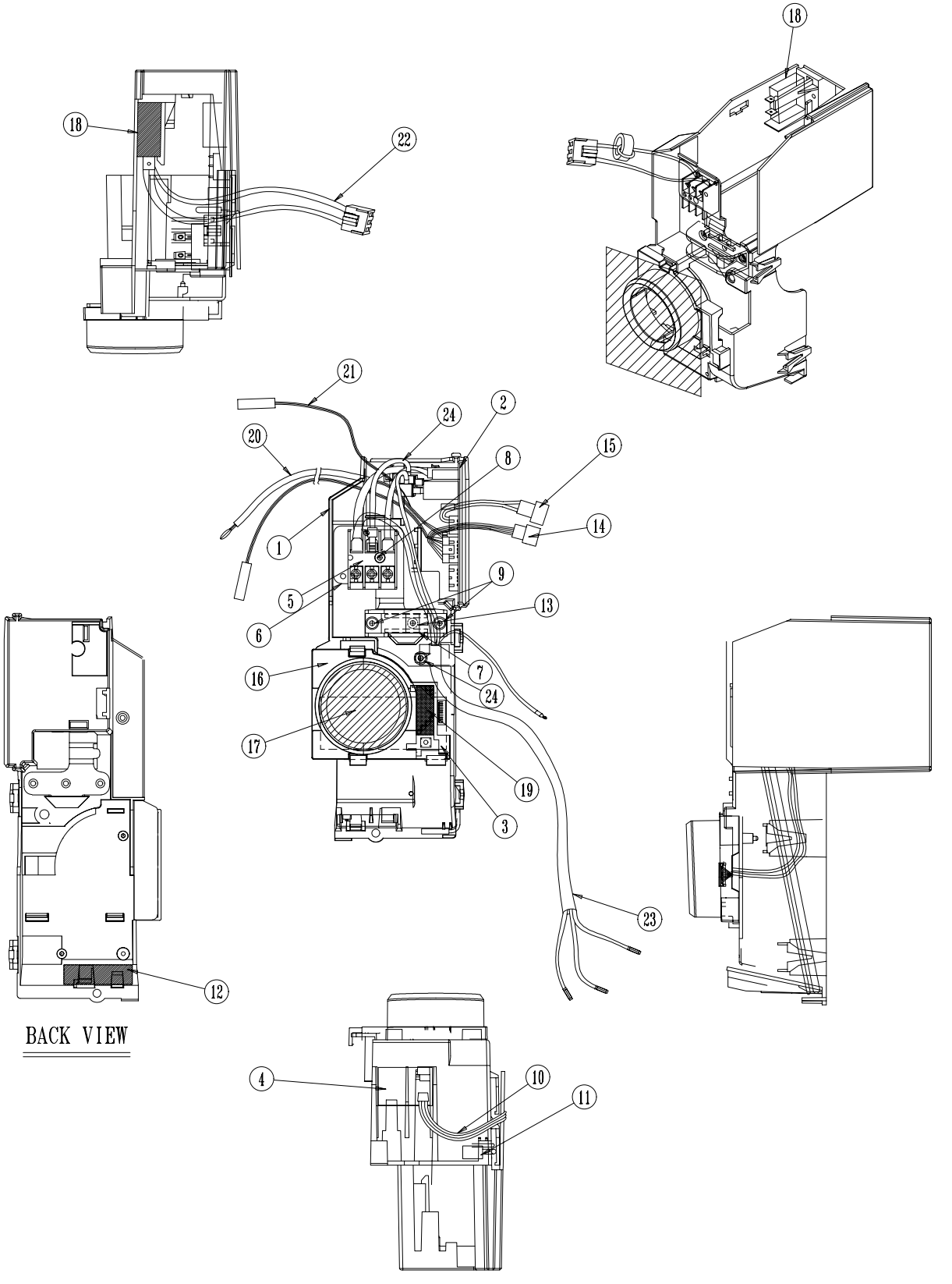
DB98_19047A(1)_2 4/21/04 2:27 PM Page 33

Parts List

No.	Code No.	Description	Specification	Q'TY	
				SH09BPHX	SH12BPHX
1	DB90-01581A	ASS'Y-CABI FRONT	ASS'Y	1	1
2	DB63-00847A	GUARD FAN	PP	1	1
3	DB90-01332A	ASS'Y-CABI SIDE LF	ASS'Y	1	1
3-1	DB64-01094A	CABINET-SIDE LF COATING	SC-90073T	1	1
3-2	DB64-00992A	HANDLE-LF	PP	1	1
4	DB90-01546A	ASS'Y-CABI SIDE RH	ASS'Y	1	1
5	DB63-00843A	COVER-VALVE	PP	1	1
6	DB90-01330F	ASS'Y BASE-OUTDOOR	ASS'Y	1	1
7	DB99-00401B	ASS'Y VALVE-BRACKET	ASS'Y	1	1
8	DB94-00584B	ASS'Y PARTITION	ASS'Y	1	1
9	DB61-01644A	BRACKET MOTOR	SGCC-M	1	1
10	DB97-02225A	ASS'Y SUPPORT-PLATE B/M		1	1
11	DB31-00220A	MOTOR FAN	YDK-020S62213-03	1	-
	DB31-00238A	MOTOR FAN	SIC-52FV-D828-1	-	1
12	DB67-00397A	FAN-PROPELLER		1	1
13	DB60-30004A	NUT-FLANGE		1	1
14	DB63-00763A	GROMMET ISOLATOR	NR	3	3
15	DB60-30028A	NUT-WASHER		3	3
16	DB96-03602A	ASS'Y COND	ASS'Y	1	1
17	DB93-02740C	ASS'Y CONTROL OUT	SH12BPHX	-	1
	DB93-02740D	ASS'Y CONTROL OUT	SH09BPHX	1	-
18	DB63-01043A	FELT COMP SIDE	FELT	1	1
19	G4C090LU1ER	COMPRESSOR	G4C090LU1ER	1	1
20	DB99-00481B	ASS'Y VALVE 4WAY	ASS'Y	1	1
21	DB97-02490B	ASS'Y VALVE EEV	ASS'Y	1	1
22	DB71-00090E	BAR-STEEL	ASS'Y	1	1
23	DB32-00083C	ASS'Y THERMISTOR OUT	ASS'Y	1	1
24	DB32-00121A	ASS'Y THERMISTOR OLP/SUC	ASS'Y	1	1
25	DB33-00021A	SOLENOID-REACTOR	12A, 21mH	1	1
26	3301-001738	CORE-FERRITE	ASS'Y	0	1

7-3 Ass'y Control In (Indoor Unit)

■ **SH09BPH / SH12BPH : DB93-02583A**

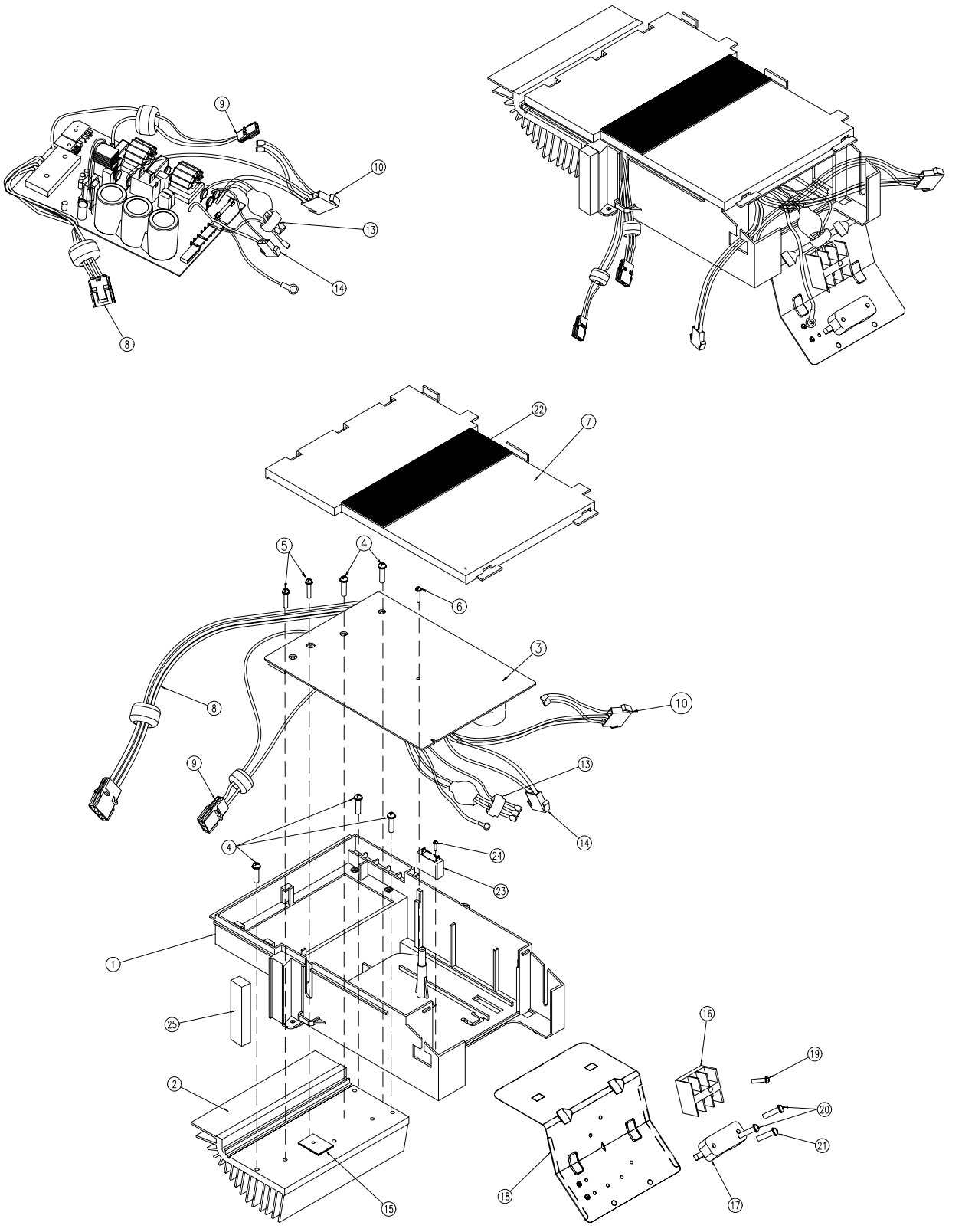


■ **Parts List**

No.	Code No.	Description	Specification	Q'TY	Remark
1	DB61-01631A	CASE-CONTROL	ABS	1	
2	DB93-02584B	ASS'Y MAIN PCB	ASS'Y	1	
3	DB93-01368G	ASS'Y S/W & DISPLAY PCB	ASS'Y	1	
4	DB93-01369A	ASS'Y-MODULE PCB	ASS'Y	1	
5	DB65-00149A	ASS'Y TERMINAL BLOCK	ASS'Y	1	
6	DB70-00289A	PLATE TERMINAL LOW	SGCC-M,T1.2	1	
7	DB61-00171A	HOLDER WIRE CLAMP	HIPS	1	
8	6001-000929	SCREW-MACHINE	PH M3xL22	1	SNA
9	6001-000725	SCREW-MACHINE	TH M4xL16	2	SNA
10	DB93-01380B	C/W MODULE	ASS'Y	1	
11	DB39-00793A	C/W STEP MOTOR UP/DOWN	ASS'Y	1	SNA
12	DB62-01368X	SEAL	61x40x3,30FOAM-PE,GRAY	1	SNA
13	-	SCREW-MACHINE	PH M4x10	1	
14	DB39-00780B	C/W STEPPING MOTOR	ASS'Y(AUTO GRILLE)	1	
15	DB39-00820A	C/W ION-PCB	ASS'Y	1	
16	DB61-01110A	HOLDER-DISPLAY	ABS	1	
17	DB64-00763A	HALF MIRROR	95,T1.5	1	
18	2301-001339	FAN CAPACITOR	1.2 µF/450V	1	
19	DB72-00126N	SEAL	T3, FOAM-PE,GRAY	1	
20	DB32-00084B	THERMISTOR	OUT,ø6,220	1	
21	DB32-00054B	THERMISTOR	IN,ø5,200	1	
22	DB39-00183A	C/W FAN_CAP	UL1015 AWG #22	1	
23	DB93-01549C	POWER CORD	15A	1	
24	6001-001054	SCREW-MACHINE	TH M4xL10	1	

7-4 Ass'y Control Out

■ **SH09BPHX : DB93-02740D**
SH12BPHX : DB93-02740C



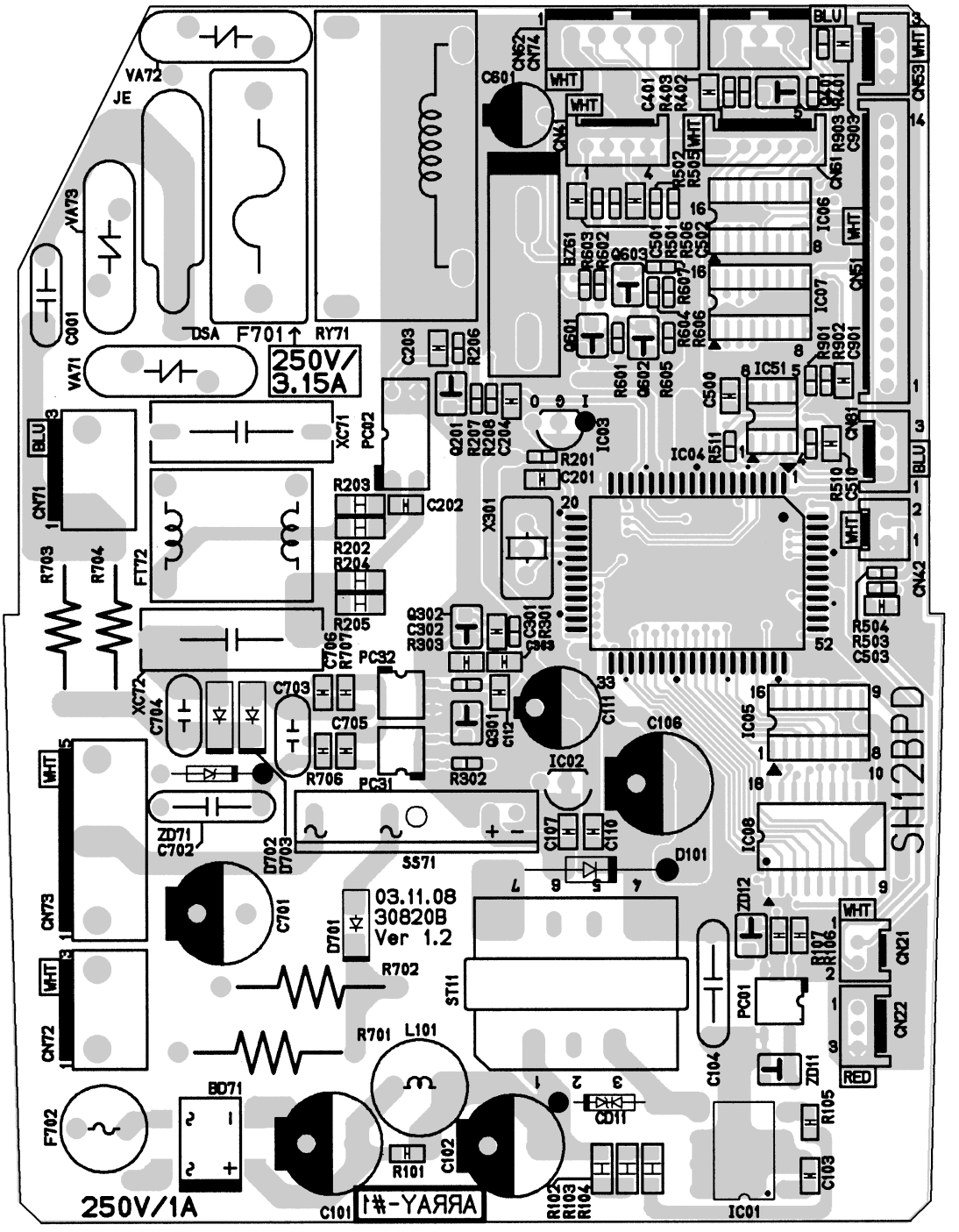
■ **Parts List**

No.	Code No.	Description	Specification	Q'TY	
				SH09BPHX	SH12BPHX
1	DB93-01627A	CASE CONTROL BASE	ABS 5V	1	1
2	DB62-02749A	HEAT SINK MAIN	-	1	1
3	DB93-02741C	ASS'Y PCB OUT	ASS'Y	-	1
	DB93-02741D	ASS'Y PCB OUT	ASS'Y	1	-
4	6006-001051	SCREW-MACHINE	M4xL16 WSP PH+	5	5
5	6006-000160	SCREW-MACHINE	M3xL16 WSP PH+	2	2
6	6002-000630	SCREW-TAPPING	PH,+,2S,M3,L8	1	1
7	DB61-01628A	CASE CONTROL COVER	RESIN-ABS	1	1
8	DB39-00608E	CONNECTOR WIRE COMP	UL1015 AWG#16	1	1
9	DB39-00607B	CONNECTOR WIRE REACTOR	UL1015 AWG#16	1	1
10	DB39-01003A	CONNECTOR WIRE FAN	UL1007 AWG#20	1	-
11	-	-	-	-	-
12	-	-	-	-	-
13	DB93-02775A	ASS'Y L/W POWER	UL1015 AWG#16	1	1
14	DB39-00649C	CONNECTOR WIRE 4 WAY V/V	UL1015 AWG#18	1	1
15	-	INSULATOR-MICA	-	1	1
16	DB65-00086A	ASS'Y TERMINAL BLOCK 3P	3P	1	1
17	DB61-00250A	HOLDER WIRE	PP	1	1
18	DB70-00465A	PLATE-CASE CONTROL	SGCC-MTO.6	1	1
19	6003-000325	SCREW-TAPPING	PH,+,2,M3,L20	1	1
20	6005-000643	SCREW-TAPPING	TH,+,1,M4,L10	2	2
21	6002-000171	SCREW-TAPPING	PH,+,2S,M4,L10	1	1
22	-	FOAMLEX	60x180xT2.0	1	1
23	DB93-00936A	RUN CAPACITOR	1.7µF/450V	1	-
24	-	SCREW-TAPPING	M3x14 WSP PH+	1	-
25	DB62-02541L	SEAL CASE CONTROL BASE	70x15xT10	1	1

8. PCB Diagram

8-1 ASS'Y PCB Indoor Unit : DB93-02584A

■ TOP



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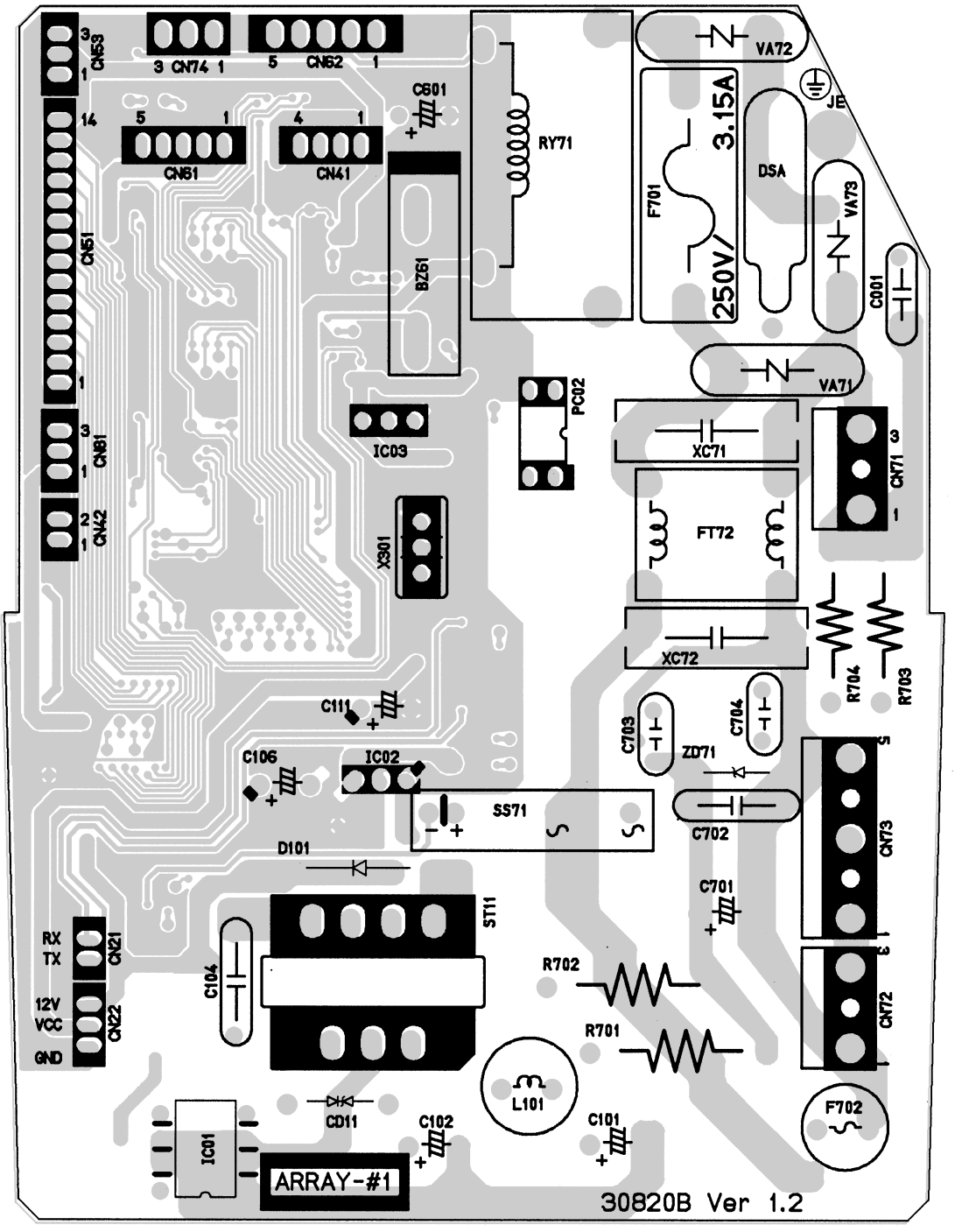

CN53
CN74
CN52
C601
CN61
CN41
RY71
VA72
3.15A
250V/
F701
DSA
VA73
C001
JE
BZ61
CN51
VA71
PC02
IC03
XC71
CN71
CN81
CN42
X301
FT72
XC72
R704
R703
C111
C106
IC02
C703
C704
ZD71
SS71
C702
CN73
D101
C701
ST11
RX
TX
CN21
12V
VCC
CN22
GND
C104
R702
R701
CN72
L101
F702
CD11
C102
C101
IC01
ARRAY-#1
30820B Ver 1.2

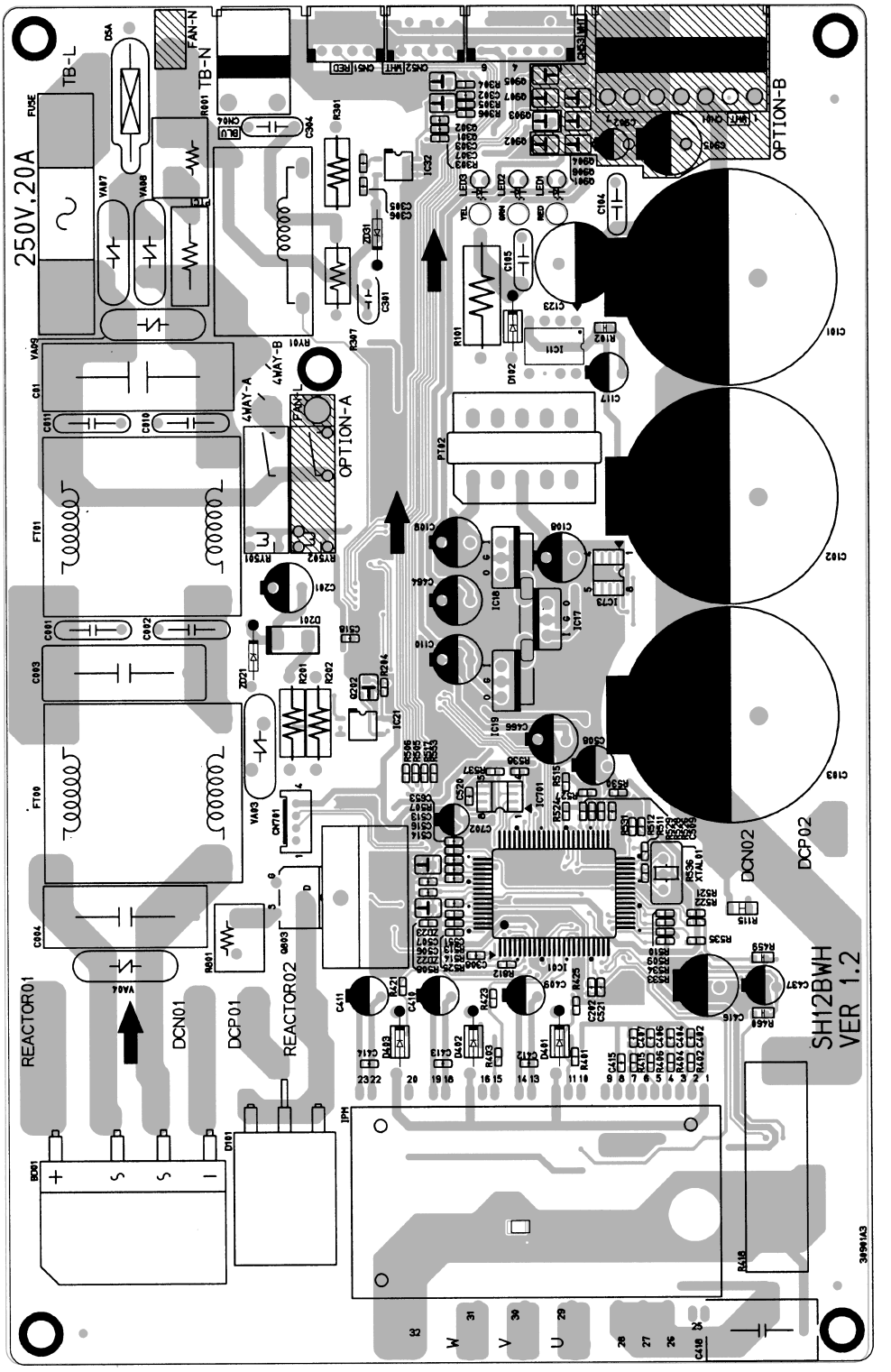
■ Parts List

Location No.	Description	Specification	Q'TY	Remark
D101	DIODE-RECTIFIER	UG2D,200V,2A,DO-204AC,TP	1	
D701,D702,D703	DIODE-RECTIFIER	MRA4005,600V,1A,SMA,TP	3	
BD71	DIODE-BRIDGE	DF06S,600V,1A,SMD-4,TP	1	
ZD11	DIODE-ZENER	BZX84C3V6,3.6,350mW,SOT-23,TP	1	
ZD71	DIODE-ZENER	1N4749A,24V,5%,1W,DO-41,TP	1	
ZD12	DIODE-ZENER	BZX84-C11,10.4-11.6V,350MW,SOT-23,TP	1	
CD11	DIODE-TVS	ST02D-200,185/200/215V,200W,DO-214	1	
Q201,Q401,Q602	TR-SMALL SIGNAL	2SC2412K,NPN,200mW,SOT-23,TP,1	3	
Q603	TR-SMALL SIGNAL	MMST2907A,PNP,200mW,SOT-23,TP,100-	1	
Q301,Q302,Q601	TR-DIGTAL	DTC114EKA,NPN,200mW,10K/A0K,SOT-23,TP	3	
IC05,IC06,IC07	TR-ARRAY	2003,NPN,7,1W,SOP-16,ST,1000	3	
PC02	PHOTO-COUPLER	TR,50-150%,200mW,DIP-4,ST	1	
PC01,PC31,PC32	PHOTO-COUPLER	TR-100-300,200mW,SOP,TP	3	
IC08	IC-SOURCE DRIVER	TD62783AFW,SOL,18P,-,8,-500MA,TP	1	
IC51	IC-EEPROM	93LC56,128x16Bit,SOP,8P,150MIL,-,2.5V,-	1	
IC03	IC-VOLTAGE COMP.	7533,TO-92,3P,-,SINGLE,-,-,PLASTIC	1	
IC01	IC-PWM CONTROLLER	255,DIP,8P,300MIL,PLASTIC,-0.3/7	1	
VA71,VA72,VA73	VARISTOR	INP14D561K	3	
R703,R704	R-METAL OXIDE(S)	4.7Kohm,5%,2W,AA,TP,4x12mm	2	
R701,R702	R-METAL OXIDE(S)	47Kohm,5%,3W,AA,TP,6x16mm	2	
R601,R602	R-CHIP	10Kohm,1%,1/10W,TP,1068	2	
R504,R505,R506	R-CHIP	330ohm,5%,1/10W,TP,1068	3	
R302,R604,R605	R-CHIP	470ohm,5%,1/10W,TP,1068	1	
R201,R207,R208,R301	R-CHIP	1Kohm,5%,1/10W,TP,1068	8	
R401,R403,R607,R903				
R603,R901	R-CHIP	4.7Kohm,5%,1/10W,TP,1068	2	
R206,R902	R-CHIP	10Kohm,5%,1/10W,TP,1068	2	
R510,R511	R-CHIP	47Kohm,5%,1/10W,TP,1068	2	
R606	R-CHIP	560ohm,5%,1/10W,TP,1068	1	
R706	R-CHIP	100Kohm,5%,1/8W,TP,2012	1	
R202,R203,R304,R205	R-CHIP	100Kohm,5%,1/4W,TP,3216	4	
R707	R-CHIP	1Kohm,5%,1/8W,TP,2012	1	
R102,R103,R104	R-CHIP	220Kohm,5%,1/4W,TP,3216	3	
R106,R407	R-CHIP	220ohm,5%,1/8W,TP,2012	2	
R101	R-CHIP	4.7Kohm,5%,1/8W,TP,2012	1	
R105	R-CHIP	470ohm,5%,1/8W,TP,2012	1	
R402,R501,R502,R503	R-CHIP	6.8Kohm,1%,1/10W,TP,1068	4	
R303	R-CHIP	8.2Kohm,1%,1/10W,TP,1068	1	
C104	C-CERAMIC,DISC	2.2NF,20%,400V,Y5U,BK,12.5x6mm,10	1	
C103,C107,C110,C112,C201	C-CER,CHIP	100nF,+80-20%,50V,Y5V,TP,2012	11	
C202,C500,C501,C502,C503				
C901				

■ **Parts List (cont.)**

Location No.	Description	Specification	Q'TY	Remark
C301,C510,C706,C903	C-CER,CHIP	1nF,10%,50V,X7R,TP,2012,-	4	
C203,C204,C302,C303	C-CER,CHIP	10nF,+80-20%,50V,Y5V,TP,2012	6	
C401,C705				
C702	C-FILM,LEAD-PEF	10nF,10%,630V,TP,16x11x7.5mm,5	1	
C703,C704	C-FILM,LEAD-PEF	4.7nF,10%,100V,TP,10x8.5x5.0mm	2	
XC71,XC72	C-FILM,MPPF	100nF,10%,275V,BK,18x6x12,15	2	
C111	C-AL	470uF,20%,16V,GP,TP,8x11.5,5	1	
C106	C-AL	1000uF,20%,25V,GP,TP,13x20,5	1	
C701	C-AL	470uF,20%,50V,GP,TP,13x20,5	1	
C601	C-AL	47uF,20%,50V,GP,TP,6.3x11,5	1	
C101,C102	C-AL	6.8uF,20%,450V,GP,TP,10x16mm,5	2	
L101	INDUCTOR-RADIAL	5000uH,10%,8.0x11.0mm	1	
X301	RESONATOR-CERAMIC	10MHz,0.5%,TP,10.0x5.0x10.0mm	1	
BZ61	BUZZER-PIEZO	70dB,3V,-,2KHz,BK	1	
RY71	RELAY-POWER	12VDC,0,9W,20000MA,SPST,20MS,10MS	1	
SS71	SSR	12Vdc,-,2A,1mS,1mS	1	
F701	FUSE-CARTRIDGE	250V,3.15A,FAST-ACTING,CERAMIC,5.2x20mm	1	
F702	FUSE-RADIAL LEAD	250V,1A,TIME-LAG,-,8.5x8mm	1	
CN72	CONNECTOR-HEADER	1WALL,2P,1R,7.92mm,STRAIGHT,SN,WH	1	
CN73	CONNECTOR-HEADER	1WALL,3P,1R,7.92mm,STRAIGHT,SN,WH	1	
CN74	CONNECTOR-HEADER	BOX,3P,1R,2.5mm,STRAIGHT,SN,BLU	1	
CN62	CONNECTOR-HEADER	BOX,5P,1R,2.5mm,STRAIGHT,SN	1	
CN71	CONNECTOR-HEADER	1WALL,2P,1R,7.92mm,STRAIGHT,SN,BLU	1	
CN42	CONNECTOR-HEADER	BOX,2P,1R,2mm,STRAIGHT,SN,WHT	1	
CN51	CONNECTOR-HEADER	BOX,14P,1R,2mm,STRAIGHT,SN	1	
CN53	CONNECTOR-HEADER	BOX,3P,1R,2mm,STRAIGHT,SN	1	
CN61	CONNECTOR-HEADER	PH-5A,BOX,5P,2mm,WHT	1	
CN41	CONNECTOR-HEADER	BOX,4P,1R,2mm,STRAIGHT,SN,WHT	1	
CN81	CONNECTOR-HEADER	PH-3A,BOX,3P,1R,2mm,BLU	1	
IC02		KA78L05AZTA(0.1A,Positive,Vol,Reg)	1	
IC04	IC MICOM	MB89538APF-101,MB89538APF-101,64P,+5V,10M	1	
ST11	TRANS SWITCHING	DC12V,-,-,-,-,-,-,12V,0.01A,-,E119	1	
DSA	POSISTOR	DSA-332MA,2pF MAX,100Mohm,ASM-3	1	
JE	LEAD-WIRE	UL1015 AWG#20 GRN/YEL	1	
PCB			1	
FT72		LS403110	1	
C001		SC102M Y-CAP 7.5mm	1	

■ TOP


250V,20A
TB-L
TB-N
FAN-N
OPTION-B
OPTION-A
4WAY-A
4WAY-B
FAN-L
REACTOR01
REACTOR02
DCN01
DCP01
DCN02
DCP02
SH12BWH
VER 1.2

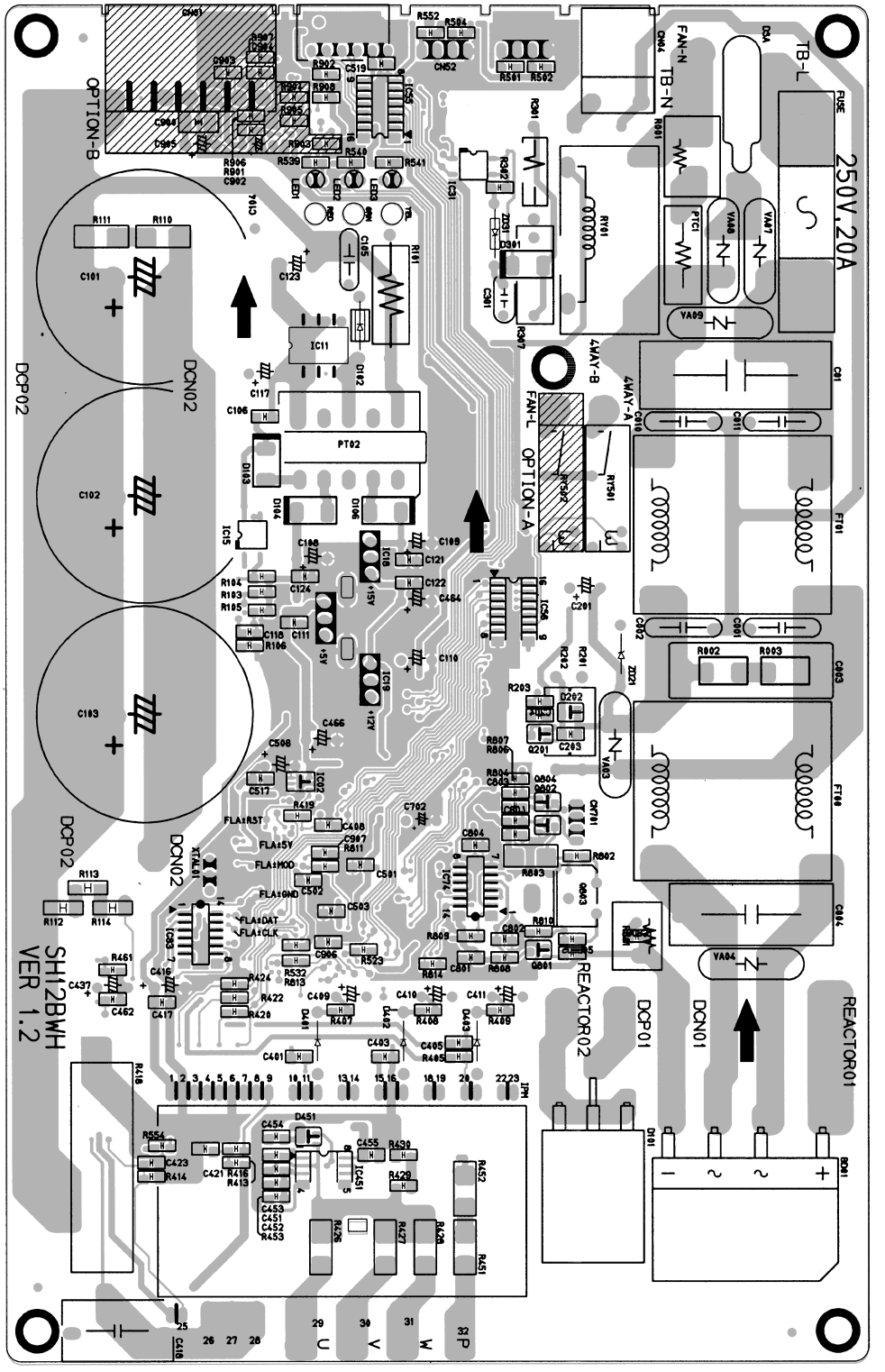
■ Parts List

Location No.	Description	Specification	Q'TY
D102	DIODE	1N4937,600V/1A	1
BD01	DIODE-BRIDGE	GSIB2560	1
C011,C010	C-CERAMIC	103,2KV	2
C003,C004	C-CERAMIC	0.33uF,275V	2
C01	C-CERAMIC	684,275V	1
C101,C102,C103	C-AL	560uF,400V	3
C104,C105,C304	C-CERAMIC	222,2KV	3
C123	C-AL	10uF,450V	1
C201,C437,C117,C508	C-AL	47uF,35V	4
C301	C-FILM	10nF,100V	1
C303,C308	C-CER,CHIP	1nF,50V,1608	2
C402,C404,C406,C407	C-CER,CHIP	470pF,1608	4
C409,C410,C411	C-AL	47uF,50V	3
C416,C905	C-AL	220uF,50V	2
C418	C-FILM	100nF,630V	1
C464,C466,C108,C109,C110	C-AL	220uF,25V	5
C509	C-CER,CHIP	47nF,50V,2012	1
C520,C516,C506,C507,C513,C514,C202 C518,C551,C413,C414,C415,C412	C-CER,CHIP	100nF,25V,1608	13
C521,C305,C306,C302,C307	C-CER,CHIP	10nF,50V,1608	5
C653	C-CERAMIC	10nF,25V	1
C702	C-AL	100uF,16V	1
C902	C-AL	10uF,50V	1
CN01	CONNECTOR-HEADER	YAW396-07V,WHT	1
CN04	CONNECTOR-HEADER	YAW396-03AV,BLU	1
CN52,CN51	CONNECTOR-HEADER	SMAW250-04,WHT	2
CN53	CONNECTOR-HEADER	SMAW250-06,WHT	1
CN701	CONNECTOR-HEADER	SMW200-04,NTR	1
D101	DUAL-DIODE	FEP30JP	1
D201	DIODE-RECTIFIER	US1G,400V	1
D401,D402,D403	DIODE-RECTIFIER	1N4937,600V,1A	3
DSA	SURGE-ABSORBER	DSA332M	1
FT01	SS2915044B	SS2915044B	1
FT00	SS2915025B	SS2915025B	1
FUSE	FUSE	65TS-150-H,250V,20A	1
IC01	IC-MICOM	ML66Q517	1
IC11	IC-PWM CONTROLLER	TOP222P,8P/DIP	1
IC17	IC-POSI.FIXED REG	KA7805A,TO-220	1
IC18	IC-POSI.FIXED REG	KA7815	1
IC19	IC-POSI.FIXED REG	KA7812A,TO-220	1
IC21,IC32	PHOTO-COUPLER	TLP181-GRH,150-300%	2
IC701	IC-EEPROM	93LC56,128x16Bit	1
IC73	IC-POSI.ADJUST REG	TL431,8P/SMD	1

■ **Parts List (cont.)**

Location No.	Description	Specification	Q'TY
IPM	IPM	FSAM15SM60A,*	1
LED1	LED	3mm/2.54,RED	1
LED2	LED	3mm/2.54,GRN	1
LED3	LED	3mm/2.54,YEL	1
PT02	PULSE TRANS	PT_30AM,*	1
PTC1	PTC	PTC,27R	1
Q202,Q302,Q301,Q905,Q907,Q902	TR-DIGITAL	KRC102S,*	6
Q803	IGBT-SGL	IRG4BC30F,*	1
Q901,Q903,Q904,Q906	TR-DIGITAL	KRA102S,SOT-23	4
R001	R-CEMENT	200-J,5W	1
R101	R-METAL OXIDE(S)	47K-J,3W	1
R102	R-CHIP	6.8-F,1/10W,2012	1
R115	R-CHIP	14.3K-F,1/4W,3216	1
R201	R-METAL OXIDE	47K-J,2W	1
R202	R-METAL OXIDE	100K-J,2W	1
R204,R515	R-CHIP	20K-J,1/8W,1608	2
R301,R307	R-METAL OXIDE(S)	4.7K-J,2W	2
R303,R304	R-CHIP	470-J,1/10W,1608	2
R305,R404,R403,R402,R401,R406,R415	R-CHIP	4.7K-J,1/12W,1608	7
R306	R-CHIP	560-J,1/12W,1608	1
R418	R-CHIP	0.02R-J,7W	1
R425,R423,R421	R-CHIP	100-J,1/8W,1608	3
R459	R-CHIP	47K-J,1/8W,2012	1
R460	R-CHIP	20K-J,1/8W,2012	1
R507,R508	R-CHIP	1K-F,1/12W,1608	2
R510,R511,R509	R-CHIP	100K-J,1/12W,1608	3
R512	R-CHIP	5.6K-J,1/12W,1608	1
R513,R514,R529,R528,R527,R526,R530	R-CHIP	10K-F,1/12W,1608	15
R531,R525,R524,R522,R521,R533,R534			
R535			
R536	R-CHIP	1M-J,1/10W,1608	1
R537,R538	R-CHIP	10K-J,1/10W,1608	2
R801	R-CEMENT	0.045-J,3W	1
R812,R506,R517,R505,R553	R-CHIP	330-J,1/12W,1608	5
RY01	RELAY-POWER	UKH-12S,12Vdc/20A	1
RY502,RY501	RELAY-MINIATURE	FTR-F3AA012E,12Vdc/5A	2
VA07,VA08,VA09,VA03,VA04	VARISTOR	INR14D561K-RS,560V,2500A	5
XTAL01	RESONATOR-CERAMIC	6.25MHz,*	1
ZD21	DIODE-ZENER	1N4749A,24V/1W	1
ZD23,ZD22	DIODE-ZENER	MMBZ5232B,*	2
ZD31	DIODE-ZENER	1N4751A,30V/1W	1

■ BOTTOM


250V,20A
TB-L
TB-N
FAN-N
FAN-L
OPTION-A
OPTION-B
4WAY-A
4WAY-B
DCP02
DCN02
DCP01
DCN01
REACTOR01
REACTOR02
SH12BWH
VER 1.2

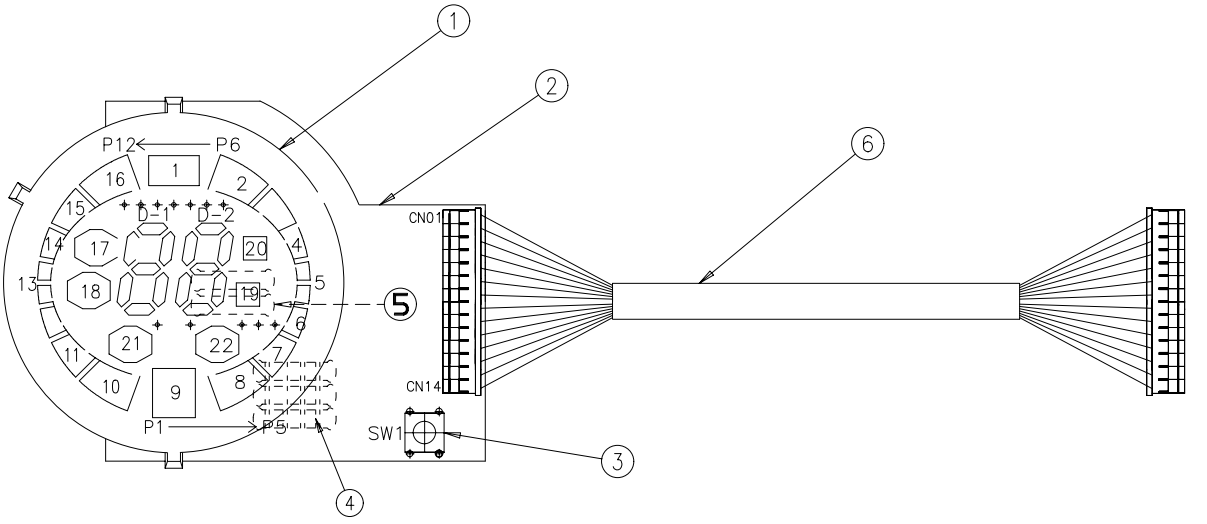
■ Parts List

Location No.	Description	Specification	Q'TY
C111,C801	C-CER,CHIP	1uF,2012	2
C203,C421	C-CER,CHIP	1nF,50V,2012	2
C401,C403,C405,C517	C-CER,CHIP	1.2nF,2012	4
C106,C118,C121,C122,C124,C408	C-CER,CHIP	100nF,50V,2012	11
C417,C423,C519,C802,C803			
C451	C-CERAMIC	33pF,25V	1
C452	C-CERAMIC	4.7nF,25V	1
C453,C454,C462	C-CER,CHIP	2.2nF,2012	3
C806	C-CER,CHIP	470pF,50V,2012	1
C900	C-CER,CHIP	1uF,3225	1
C204,C455,C501,C502,C503,C804	C-CER,CHIP	10nF,50V,2012	12
C805,C807,C903,C904,C906,C907			
D103,D104,D106	DIODE-RECTIFIER	ES1D,200V/1A	3
D202,D451	DUAL-DIODE	DCB010,*	2
D301	DIODE	ES1D,200V	1
IC02	S80142	S80142ANMC-JC3T2,*	1
IC15	PHOTO-COUPLER	TLP181,*	1
IC31	PHOTO-COUPLER	TLP181-GRH,150-300%	1
IC451	IC-OP AMP	LA6393M,*	1
IC55,IC56	TR-ARRAY	ULN2003AFW,1W	2
IC74	IC-LOGIC	74HCT00D,SOP-14	1
IC83	LM324	LM324,*	1
Q201,Q802	TR-DIGITAL	KRC102S,*	2
Q801,Q804	TR-SMALL SIGNAL	BC847B,*	2
R002,R003	R-CHIP	470K-F,1/2W,5025	2
R105	R-CHIP	6.8K-F,1/8W,2012	1
R110,R111,R451	R-CHIP	180K-F,6432/1W	3
R112,R113,R114	R-CHIP	470K-F,1/4W	3
R203,R405,R461,R804	R-CHIP	4.7K-J,1/8W,2012	4
R407,R408,R409	R-CHIP	33-J,1/10W,2012	3
R104,R106,R413	R-CHIP	3.3K-J,1/8W,2012	3
R414,R523,R532,R808,R810	R-CHIP	10K-F,1/10W,2012	5
R416	R-CHIP	390-J,1/10W,2012	1
R419,R420,R422,R424	R-CHIP	100-J,1/8W,2012	4
R426,R427,R428	R-CHIP	300K-F,1W,6432	3
R429	R-CHIP	1.6K-F,1/8W,2012	1
R430	R-CHIP	51-F,1/8W,2012	1
R452	R-CHIP	150K-F,1W,6432	1

■ **Parts List (cont.)**

Location No.	Description	Specification	Q'TY
R453	R-CHIP	2.7K-F,1/8W,2012	1
R501,R504	R-CHIP	5.1K-F,1/8W,2012	2
R539,R540,R541	R-CHIP	2.2K-J,1/8W,2012	3
R502,R552	R-CHIP	24K-F,1/8W,2012	2
R554	R-CHIP	470-J,1/8W,2012	1
R802	R-CHIP	220-J,1/8W,2012	1
R803	R-CHIP	2.2K-F,6432/1W	1
R805	R-CHIP	3.3K-F,1/8W,2012	1
R302,R807	R-CHIP	1K-J,1/8W,2012	2
R103,R811,R813	R-CHIP	330-J,1/8W,2012	3
R814	R-CHIP	5.1K-J,1/8W,2012	1
R806,R809,R901,R902, R903,R904,R905,R908	R-CHIP	10K-J,1/8W,2012	8
R906	R-CHIP	6.8K-J,1/8W,2012	1
R907	R-CHIP	560-J,1/8W,2012	1

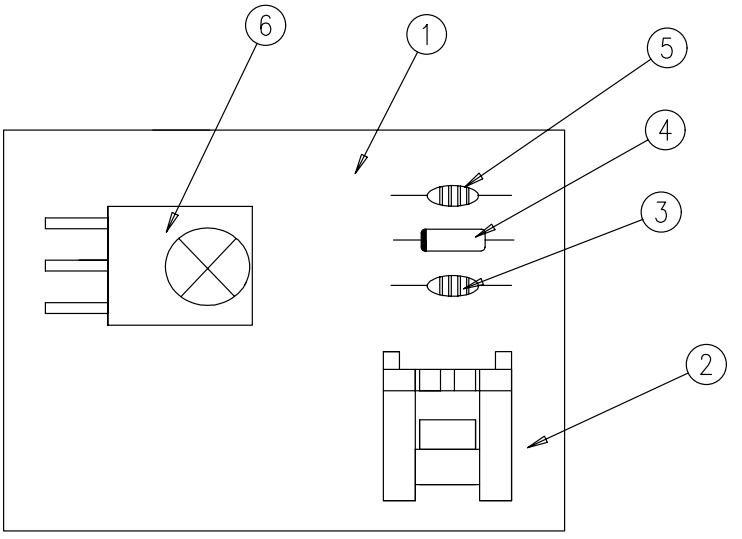
8-3 ASS'Y DISPLAY PCB(9K/12K) : DB93-01368G



■ **Parts List**

No	Description	Specification	Q'TY	Remark
1	ASS'Y LED MODULE		1	SNA
2	PCB-DISPLAY	FR-1 T1.6	1	SNA
3	TACT SWITCH	KPT-1105A TSTA-2	1	SNA
4	RESISTOR	200ohm, 2W	2	SNA
5	RESISTOR	100ohm, 2W	3	SNA
6	CONNECTOR WIRE	14P	1	SNA

8-4 ASS'Y MODULE PCB(9K / 12K) : DB93-01369A



■ **Parts List**

No	Description	Specification	Q'TY	Remark
1	PCB-DISPLAY	FR-1 T1.6	1	SNA
2	CONNECTOR	SMAW200-03P(WHT)	1	SNA
3	C-CERAMIC	CA OA 50V 102K	1	SNA
4	DIODE SWITCHING	1N4148	1	SNA
5	C-CERAMIC	CA OA 50V 104Z	1	SNA
6	MODULE REMOCON	FRP4021-H7(7mm)	1	SNA

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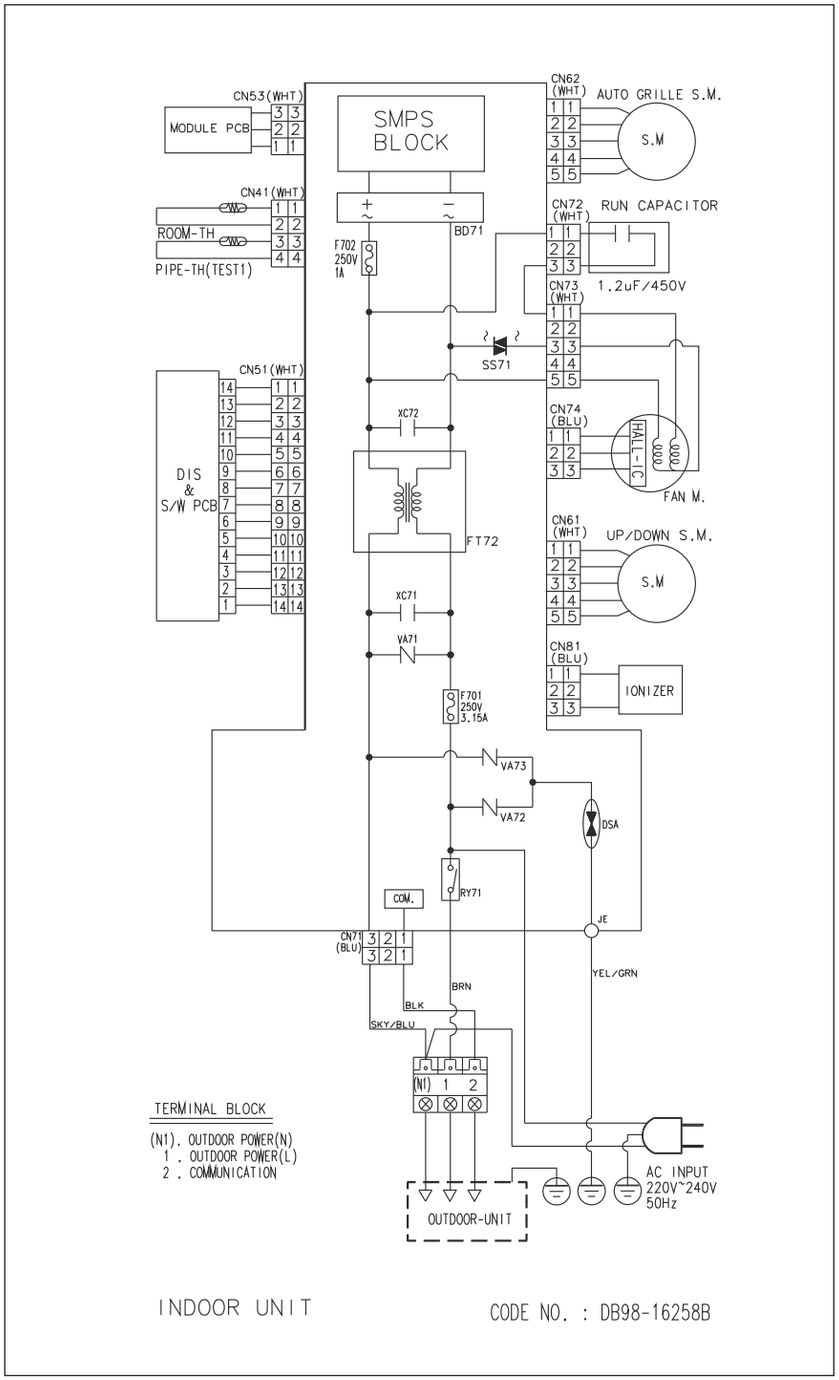
9. Wiring Diagram

9-1 Indoor Unit(9K/12K)



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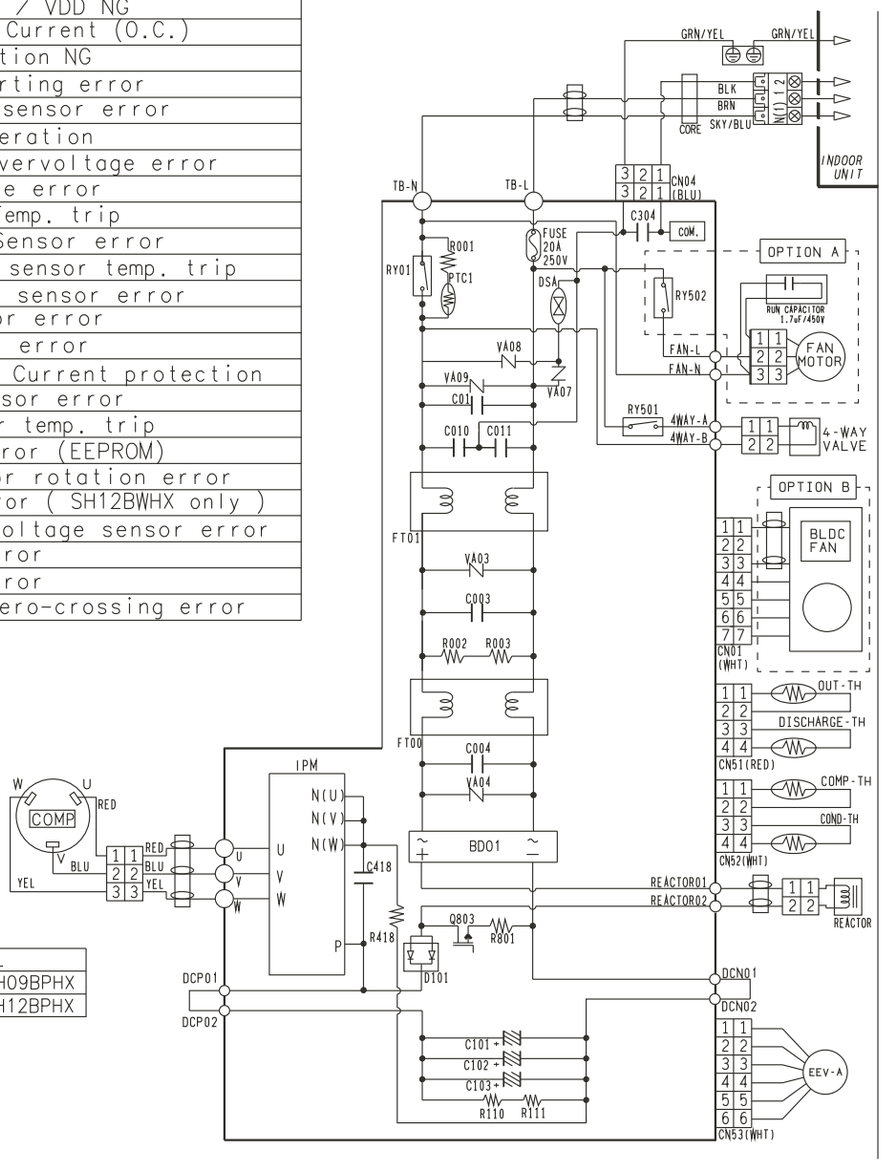
9-2 Outdoor Unit(9K/12K)

LED PATTERN			DESCRIPTION
YEL	GRN	RED	
×	×	×	Power Off / VDD NG
×	×	◎	Comp Peak Current (O.C.)
×	×	●	Communication NG
×	◎	×	Comp. Starting error
×	◎	◎	Heatsink sensor error
×	◎	●	Normal Operation
×	●	◎	DC-link overvoltage error
×	●	●	4Way valve error
◎	×	×	Heatsing Temp. trip
◎	×	◎	Outdoor Sensor error
◎	×	●	Discharge sensor temp. trip
◎	◎	×	Discharge sensor error
◎	◎	◎	OLP sensor error
◎	◎	●	CT sensor error
◎	●	×	Unit Over Current protection
◎	●	◎	Cond. Sensor error
◎	●	●	OLP sensor temp. trip
●	×	◎	OPTION error (EEPROM)
●	×	●	Compressor rotation error
●	◎	×	DC fan error (SH12BWHX only)
●	◎	◎	DC-LINK voltage sensor error
●	◎	●	PFC OC error
●	●	×	NO GAS error
●	●	◎	AC Line zero-crossing error

●: LED ON
◎: LED BLINKING
×: LED OFF

OPTION	MODEL
OPTION A	SH09BWHX, SH09BPHX
OPTION B	SH12BWHX, SH12BPHX



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